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COCOA AND CHOCOLATE.

NEARLY a century before Sir Walter Raleigh astonished the English people by bringing tobacco from America and teaching them how to smoke it, to the great scandal of the "unco' guid" of those days, Columbus had introduced cocoa into his native land. How long the inhabitants of Mexico and Peru had been acquainted with its nourishing properties we do not know; but certainly it was carefully cultivated and so much esteemed that the cocoa bean was an article of currency when the Spanish explorer first visited those shores. There is not the halo of tradition and sentiment which centers around that more popular drink, tea; mainly, perhaps, because while nearly all the traces of the aboriginal South American have been swept away, China, the home of the tea plant, with all its ancient civilisation, has endured. Now is it clear how the botanists who first named the *genus* to which the cocoa tree belongs fixed on the scientific term it bears. Anyhow *theobroma* means "food of the gods," and there are those who think that, considering what valuable properties it possesses, the plant was not inaptly christened. A long time went by before it was introduced into England, for the earliest intimation of it as an article of commerce is to be found in the *Public Advertiser* of June, 1657, when it is notified that "in Bishopsgate-street, in Queen's Head-alley, at a Frenchman's house, is an excellent West India drink called chocolate to be sold where you may have it ready at any time, and also unmade at reasonable rates."

It is not a little curious that the introduction of tea and coffee dates almost from the same time: Just a year after we find in the *mercurius Politicus* an advertisement of "that excellent and by all physicians approved China drink, called by the Chineans 'teha,' by other nations 'tay,' *alias* 'tee,'" which was to be had "at the Sultaness Head Cophee House in Sweeting's-rents by the Royal Exchange." This notice would seem to show that as a drink coffee, as far as this country is concerned, has the palm of years, though now it has fallen on, comparatively speaking, evil days. Chocolate, from the first, caught the taste of the town. It was the fashionable temperance beverage—to use a modern phrase—perhaps because it was so dear—during the greater part of the Eighteenth Century, and the cocoa tree was a favourite sign and name for places of public refreshment. The writers of that time frequently refer to it. But its price kept it beyond the reach of the bulk of the people, and when fashion changed its consumption fell. In Spain and Italy chocolate—which is a rather different thing from the cocoa as we know it—has always been very largely consumed. In England it early became the subject of taxation, and in the middle of last century a customs duty of sixpence had the effect of limiting the consumption to some 440,000 lb. a year. With the new financial era the use of it began to revive, but it is only during the present generation than it has become at all popular. Of course, the Frenchman in Queen's Head-alley was wrong in calling it "a West India drink." Then it came almost wholly from South America. Now it is grown also in Dutch and British Guiana, in our Indian Empire, Ceylon, the Straits Settlements, West Africa, and the West India Islands, so that the Frenchman after all only anticipated events.

THE MODERN ARTICLE.

Its popularity in recent times is usually accounted for by the fact that it has been largely recommended by the medical profession. Unlike tea and coffee—

which are infusions and more stimulants—the whole substance of cocoa is absorbed. But a late Chancellor of the Exchequer—Mr. Goschen if memory serves aright—attributed the growth of its use as against coffee to the extensive advertising of rival manufacturers. He spoke regretfully because, as between the two in the raw state, coffee pays the higher duty. Whatever the cause, the consumption has enormously increased, and continues to grow. The cocoa we drink and the chocolate we eat—for the chocolate powder from which the beverage is made is not very popular here—are two very different things. The cocoa bean contains from 40 to 50 per cent. of cocoa-butter, the greater part of which has to be extracted in order to make the liquid digestible. In the best makes some 10 per cent. is retained. Tho cheaper qualities have very little left, and, moreover, the powder is mixed with the bean shell, while arrowroot or sago is added, to say nothing of colouring matter. But with chocolate confectionery in its almost countless forms the case is different, or should be. Here the fat is kept, sugar and milk is added, with a very small proportion of flavouring essence, and generally speaking, the chocolate is simply used to cover a cream, an almond, a walnut, and things of that sort.

Foreign Competition.

In a few articles of daily consumption has the non-British producer laboured so hard to catch trade as in this. Of course, thero are first-class English makers, both of cocoa and of chocolate confectionery. But we believe it is the fact that of the first named some of the best comes from Holland, and of the second from France, Germany, and Belgium. How much the home trade has grown, however, is shown by the latest Blue-book from the Statistical Department of the Customs House. In 1896 we imported the raw material to the extent of 32,218,803 lb. ; in 1900 the total had mounted up to 52,647,818 lb. We exported five years ago to foreign countries 474,500 lb. and to British possessions 2,146,300 lb. of the manufactured article ; the figures for 1900 being 758,000 lb. and 3,850,800 lb, respectively. In other works, taking both sets of figures we nearly doubled our exports. But when we turn to the other side of the slate we find that there is room for apprehension. The record of imports is:

	1896. lb.	1900. lb.
Manufactured cocoa or chocolate...	3,794,422	7,754,879
Manufactured with the use of spirits	51,603	106,087
Confectionery containing not more than 50 per cent. of chocolate..	12,095	37,546
Ditto, with the use of spirits.....	22,796	36,937
Totals	3,877,916	7,935,449

When it is remembered that the bulk of our exports is within the Empire the statistics show how keen and successful has been the rivalry of the foreigner.

A New Aspirant.

It is in these circumstances of the trade that another home-made cocoa has entered the field. In the old days when a man had a good thing he used to start making it in a small way and gradually push his ware. But other times other methods. Now the plan seems to be to perfect arrangements—taking, if need be. years in the process—and then, having prepared the ground as thoroughly as a von Moltke would calculate a campaign, to spring the new product on the consuming world. This is what the Mazawattee Tea Company has done. For five years experts have been studying the question, experimenting and investigating ; and very soon the "Lateriba" cocoa and chocolates will be proclaimed from the housetops. The company's large new works at Newcross are divided by a corridor into two portions. One is devoted to their tea, which the sweet uses of advertisement havo made known in every part of the country, and the other to cocoa and chocolate. The factory is one of the most perfectly equipped places for the preparation of food stuffs it is possible to conceive. Electricity is the motive power, generated by gas made on the premises. Cleanliness and perfect ventilation have been sought after and attained. The completion of an immense laundry has enabled the company to provide linen overalls for every employee, though, from the time tea chest or cocoa bag is opened to the moment the finished product is sent out in its leadfoil packages or dainty tin, hand never touches either article.

Model Works.

Every manufacturing country contributes to the collection of machinery to be found ; and many trades and crafts go on within the walls. The work of eminent artists in lithographed and printed on tins and boxes—themselves made in the works—labels are printed, lead and tin mixed to pack tea in—as little, in fact, as possible is left for outsiders to supply. The process of cocoa and confectionery making are most interesting to watch, especially the second. The maternal care which the high-class sweetmeat receives would astonish the ladies who eat it. In the "covering" room, for instance, the rich brown substance is simmering over hot water, but the upper air is cooled by brine-charged pipes fixed half way up to the ceiling, so that when a little of the delicate mixture has enclosed cream or praline it may settle quickly enough to preserve its taste and aroma. Then in the packing there is a notable departure from the custom of the trade. The sweetmeats are placed in tasteful airtight tin boxes, and the chocolates rest on layers or crepe paper coloured in harmony with the box. This is not merely for effect—though that is pleasing—but to ensure that the contents shall remain in perfet condition. Chocolate with its large proportion of fat is very susceptible to damp and to odours of flavours which may arise from the materials composing the cardboard and the coloured paper which surround many of the most expensive forms of this kind of sweetmeat. Contamination of that sort is of course. deterioration, and this the Mazawattee Company claims will be impossible with its system of packing. The company's experience with tea has shown it the importance of this consideration, and, as only one quality of cocoa and chocolate is to be made—the best, and all grown in the British Empire—precautions are doubly necessary. The cocoa, too, will be all put up in airtight cans, which, like the boxes, will be advertisements in themselves. For the Mazawattee Company believes in educating the eye as well as the palate of the people. It has shown this in the past. It intends to prove it again immediately. A well-known artist has painted an allegorical picture—Britannia welcoming the new cocoa—the reproduction of which by colour-photography makes a distinct step in the art of the hoarding. The actual process is not novel; what is new is the size to which it has been found possible to make the various blocks. In the character of the tones—particularly the dusky flesh tint of the female figure representing cocoa—and in the way the individuality of the painter is preserved the new process is unquestionably better than the best chromo-lithography.—*Morning Post.*

QUEENSLAND TREES &c. : IN BRISBANE BOTANIC GARDENS.

Between the central entrance and the one on the river bank is the cricket-field, a considerable stretch of ground, ample for the purpose. From this entrance, running the whole length of the garden, is a row of Araucaria Bidwillii, from 40 to 60 feet high. As here seen, little can be said in praise of this tree for ornamental purposes: its branches, 10 to 15 feet long, are almost invariably leafless, except from 12 to 24 inches at the end. The immense cones, of several pounds weight, are clustered at the top, hidden from view. and difficult to obtain without the assistance of a storm.

Ficus macrophylla, also a native tree, is very handsome. In the gardens is a broad-spreading specimen, with a stem 2 feet in diameter, the roots exposed for many square yards around the base; the fruit, not large, is freely borne, and the brown under-surface of the leaf offers a pleasing contrast to the solid green of the whole. Kigelia pinnata is at home, and bears many loose racemes of large deep carmine blooms, on pendent stalks 3 to 5 feet long.

The rose-garden, containing many beds surrounding the finest Araucaria Bidwillii in the grounds (a specimen about 70 feet high), is filled with well-grown plants, almost exclusively Teas and Chinas, as one might expect. A box-wood tree, Hæmatoxylon campechianum, with a much-divided stem, is close to Quercus suber, Q. Teza, and Q. cerris, from South Europe; they are, however, scarcely fine specimens, though the English Oak, Quercus pedunculata, seeds well, and makes a good tree. Liquidambar and Liriodendron are also both evidently thoroughly at home.

Near Mr. MacMahon's house is a fine bed of Arabian Coffee, loaded with berries. A bed of Allamanda neriifolia, close by, was one mass of flower.

Cedrus Deodara, Magnolia grandiflora, and Eriobotrya japonica, are not good, the climate being evidently too dry and hot for them, though a Camellia seems in a very fair condition. Plumeria acuminata is as fine and free-blooming as in India; as is a species of Terminalia, with its peculiar oblong sessile foliage. Near a Poinciana regia, its stems carrying many immense Platycerium alcicorne, is a group of Palms, two of which are probably the best specimens of the order in the gardens—one a Jubœa spectabilis, the other a Sabal Palmetto. Also fine, are an Oreodoxa regia 30 feet high, and some broad masses of Rhapis flabelliformis.

The most successful examples of growth here, as in Bowen Park, are unquestionably the Bamboos. Several large clumps of Bambusa arundinacea, with thickly interlaced tough stems, 40 to 50 feet high, cracking and bending in every breeze, shade, near the centre of the grounds, one of its prettiest spots—a large open-air fernery, containing Alsophilas Dicksonias, Asplenium nidus, Platyceriums, Ravenalas Cannas with flower-spikes 8 feet high, Caryotas Livistonas, &c. At the end is a neat avenue of Guavas (Psidum guava), the smooth Stuartia-like stems, and pale glossy foliage, through which now peep the innumerable fruits just commencing to swell, being very pretty.

The Moreton Bay Chestnut (Castanospermum australe), of course does well, as do Butea frondosa and Strychnos nux-vomica. A curious tree is Davidsonia pruriens; each leaflet of its large pinnate foliage is nearly of the substance, size, and colour of a good-sized Loquat leaf. Sterculia rupestris, the narow-leaved Bottle-tree, is more noticable still; of one specimen, the smooth circular stem is 4 feet in diameter at the base, but narrows gradually to 1 foot at 8 feet from the ground, whence for the remainder of its height (another 7 feet) only the smallest branches are seen.

The native trees do not, as here represented, strike me as particularly ornamental, though in the bush, from all accounts, some must be very fine. In the gardens, however, some trees are not particularly interesting. Agathis robusta is an exception. This can be picked out anywhere by its tall, slim clean stem and pear-shaped head of dark foliage. Two good specimens are not less than 70 feet in height.

Blœocarpus grandis, Spondia pleiogyne (the Burdekin Plum-tree), Alcurites moluccana (the Candlenut-tree), with long-lobed foliage and bunches of green fruit each as large as a good-sized egg-Plum; Erythrina Vespertilio the Australian Bark trees, and Cassia Brewsteri, its thin, circular, brown pods, 12 to 15 inches long, hanging in profusion, are all representative of the native flora. On leaving I passed beneath an Indian Cluster Fig, Ficus glomerata, the fruit on short stalks in thick bunches of every shade of colour, from green through yellow to bright red, cluster on the old branches 18 inches in diameter. The masses of fruit rotting on the ground beneath the tree testify to its extraordinary productiveness. I also noted on leaving Combretum purpureum, and Beaumontia grandiflora, growing luxuriantly. At the end of the garden Mr. MacMahon has erected a tall house, composed of long twigs so tied on rafters as to give partial shade. Beneath, sheltered from the sun's fiercest rays, are Philodendrons, Anthurium Scherzerianum, Dracænas, Marantas Gymnostachyum Pearcei, Lomaria gibba, Selaginellas, Aspleniums, Platyceriums, Dicksonia antarctica, Alsophila australis, flowering Begonias, and a few Orchids, chiefly the native Dendrobium undulatum.—*Gardeners' Chronicle.*

GUTTA-PERCHA IN DUTCH INDIA.

(TRANSLATED FROM THE "GUMMI-ZEITUNG.")

About the year 1845 the first gutta-percha, the milk of several tropical trees, appeared in the market. The gutta-percha comes almost without exception, from the Malay Archipelago, and its greater part from Dutch India, especially from Borneo and Sumatra. The natives collect his valuable product in the virgin forests, whence it is brought, through Chinese buyers, to the Singapore Market. As long as the request for it was only a small one, the natives were content with getting the gutta-percha by means of incisions in the trees, but when tho export from Singapore, which was in 1845 only 10,140 kilos., and in 1848, 720,000 kilos., increased, they began to fell the trees, in order to get more sap, without providing for the after-growth. The consequence of this bad policy, which must have been increasing during recent years, cannot be definetely seen from the figures of export from Dutch India, which were;—

1,598,330	kilos.	in	1889
2,277,326	,,	,,	1890
1,402,923	,,	,,	1891
1,201,631	,,	,,	1892
1,270,533	,,	,,	1893
1,281,664	,,	,,	1894
1,347,834	,,	,,	1895
1,337,745	,,	,,	1896
1,448,973	,,	,,	1897
4,361,514	,,	,,	1898
7,263,048	,,	,,	1899

but they are proved through the exhaustion of several districts which produced gutta-percha in earlier years. If the number of the felled trees can be estimated according to the export at some millions, and if the export increases in the same proportion as in recent years, one can imagine how we are drawing closer to the end of the gutta-percha export, whereas the request for this indispensable insulating material for telegraphic cable is, on the other hand, daily increasing. Dr. W. Burck, at that time sub-director of the Botanic Gardens at Buitenzorg, first drew attention to this danger in 1883, when, taking an official journey to the Pandangschen Boveulanden, on the west coast of Sumatra, in order to study the gutta-percha trees, he noticed the felling of the trees. As an official law preventing the felling of the trees could not be enforced in the districts, Dr. Burck proposed a way out of the difficulty by systematic cultivation of trees. This proposal found approbation with the Dutch-Indian Government, and in 1884 Doctors Burck and Treub, now director of the Botanical Gardens at Buitenzorg, were commissioned to find some land not far from Buitenzorg suitable for a plantation of gutta-percha trees. They chose for this a hilly ground of 625 acres in Tjipetir, about 1,640 feet above the sea-level, and at a distance of eight miles from the railway station of Tjibadak, in the country of Preanger Hill. In the

west monsoon, April, 1885, they began with the planting of over twelve acres. In the following year the plantation was so extended that it was necessary to bring it under constant European supervision, and it was put under control of the Council for Forests in 1891, with the order to plant only the best sorts of Palaquium. But as it did not flourish so well under this council, it was in 1900 once more brought under the supervision of the directors of the Botanic Gardens. The directors have taken the matter at once in hand in order to effect the purposes of the plantation, namely: (1) To find out the best kind of Palaquium suitable for forest-culture; (2) Study of the botanical derivation; (3) To ascertain which climatological and other conditions are the best for the growing of the plant; (4) Study of the way in which they multiply, if by seeds or otherwise. To make these tests on a bigger scale, the Government allowed a considerable amount in 1901 for the Indian Budget. In the west monsoon of this year the plantation will be enlarged by 250 acres and 1901 1902 by 552 acres. In this way an extension of 963 acres will be reached, and it is hoped to plant in the next five years 3,625 acres more. Only good kinds of Palaquinm will be employed as Palaquium gutta (Isonaudra gutta in earlier times), Palaquium borneense and Palaquium oblongifolium. If the old seed, which the tropical garden of Tjikemeuh, Tjipetir itself and a Palaquium oblongifolium plantation at Poerwokerto give sufficient it will all be used, and there will be just enough material for the planned extension of the plantation, so that no seeds can be given away from the Botanic Gardens at Buitenzorg for other purposes. This new enterprise promises to open fresh means for the settlement of the burning question of gutta-percha prodnction, and will become a guide for private enterprise in this field later on. With regard to profit, these experiences in Tjipetir will hardly be as authoritative regarding other questions, as labour is rather dear in that district on account of the great amount of private plantations, and as a Government enterprise of this kind, which answers in the first place general purposes and not the gaining of profit, works under quite different circumstances and is generally dearer than a private business, chiefly establishes with economical views. In any cae the trial plantation at Tjipetir, which has been put under the leadership of the experienced expert Dr. P. van Rombnrgh, late director of the trial garden in Tjikemeuh, promises to become of a high technical and economical interest. The market for the gutta-percha obtained in Dutch India lies not in the district of prodnction but in Singapore. This fact is proved by the figures given below which give the export for 1899, giving origin and destination of the gutta-percha:

The dominant position which Singapore takes according to this as a market for gutta-percha from Dutch India is owing to its favourable situation in the centre of the Malay Archipelago and partly to the smartness of its European and Chinese merchants. Singapore gives to a buyer of gutta-percha all possible advantages of a great market, where he can buy all kinds of gutta-percha according to sample, whereas Dutch India puts only certain kinds of gutta-percha out. If Java, which is more independent than Singapore, and where gutta-percha plantations are now flourishing, should develop and create a market for this article in its own district, cannot as yet be decided npon, but it is hardly to be expected. Besides the gardens in Tjipetir and Tjikemenh there are only two more plantations at Java, near Poerwokerto, in the country of Banjoemas, of which the elder one, from 1856, consists only of 58 trees, whereas the younger and a bigger one was founded in the early eighties. But both plantations have been neglected up to now. In other parts of Dutch India the gutta-percha plantation, for which the natives seem also to show more interest, now is only cultivated in a few districts, and in recent times through some private enterprise. In 1898 a Nederlandsch-Indische Getah Pertja Maatschappy was founded in Medan, on the east coasts of Sumatra; another recent plantation exists on the island of Bintay, in the Riouw Archipelagns. Two other companies, an English and a German one, are said to be at work on the west coast of Borneo, near Pontianak, and another firm has been established under the style of Gutta Rubber Syndicate for the prodnction of gutta-percha and caoutchouc, the plantations of which are in the territory of the Sultan of Johore. And, lastly, the Nederlausche Getah Pertja Maatshappy, established at the Hague, has still to be mentioned. All these companies use the process of extracting the gutta-percha out of the leaves by a mechanical process, which a Dutchman, P. J. Ledeboer, now a French subject, has invented. Not much has become public about the process, but it is said to be a perfect success. If, through this process, a material is created which is equal to the gutta-percha gained from the trees, and if the trees can be deprived of their leaves without being interrnpted in their growing, as seems to be possible, a further important step has been made in the production of gutta-percha, for through this process quicker and larger results can be effected than through the old simple way.

EXPORTS IN 1899.

From	To Singapore.	Penang.	Holland.	England.	Germany.	France.	Belgium.	America.	Total.
Borneo.	5,722,307	—	—	32,409	—	—	—	—	5,754,716 kilos.
Sumatra.	1,247,342	145,856	36,389	—	8,377	—	—	80	1,438,044 ,,
Total	6,969,649	145,856	36,389	32,409	8,377	—	—	80	7,192,760 kilos.
Java and Madeira	29,019	—	18,408	—	16,964	5,594	303	—	70,288 ,,
Total export	6,998,668	145,856	54,797	32,409	25,341	5,594	303	80	7,263,048 kilos.

CURE FOR THE BLACK SPOT IN TOMATOES.—Ever since this fungus disease of the Tomato made its appearance in this country, gardeners have been helpless in the matter of cure or alleviation; and beyond removing the fruit and burning it, so as to prevent the diffusion of the spores, nothings could be done. Now, Mr. J. Thomas, landscape gardener, 1, Warwick Grove, Surbiton, alleges that he has found the remedy for attacks of Cladosporium lycopersici, and certainly some fruits, which he brought to us a few days ago, and which are lying before us, show tha he is correct in his statement, for the fungus is killed superficially, and appears as a dry, brown incrustation; even the flesh below it is quite sound and uninjured and the fruit as good as possible, barring the little blemishes of about the size of a shilling. The inventor would willingly dress any diseased fruits if requested to do so, but untill he has patented the substance, he will not let it out of his hands. It is obvious that the remedy should be applied to the leaves and to the berries when quite young. It must be remembered also that the spawn of the fungus is internal, so that external applications, however useful, are only of a palliative nature.—*Gardeners' Chronicle,*

TIPS FOR RUBBER GROWING.

Mr. James Maunder writes to us from San Juan Evangelista, Vera Cruz, Mexico, under date 24th June:—

I will send rubber seed to you and others during the next 10 or 15 days. Seed is now well ripened, and just begun to come in. Instead of writting another letter *re* Nursery making, I send you a copy of a letter I have just written to the President of the Company I am working for. In it I have described the *modus operandi*. The Nursery described is, I think, the largest one ever made in this, or any other county. I am surprised that more attention is not paid to rubber cultivation all over India. In Travancore and Mysore there are thousands of acres of land adapted to the cultivation of rubber, from which the respective Governments only get a tittle money from grazers of cattle. I remember many years ago, while on a shikar expedition out in the western part of Wastara Taluq of Mysore, alone the Budra River, near Balehunoor, also on the Toongabudra, I saw some of the best kinds of rubber lands. I shall send a few hundred seed to the Amildra of that Taluq, as well as to parties in Munzerabad, asking them to give them a fair trail. I will send you 2lbs. of seed. Please make up your mind to whom you will give them, so that there will be no delay in sending them out on arrival. The seed must be planted on arrival, as I am afraid that many will have lost their germinating power on so long a journey. If the parties receiving the seed will follow the instructions as per letter herewith, all good seed will germinate; the seeds are large and well packed in charcoal as per instructions received from the best experts in the seed business. If we can make rubber pay here in Maxico where we pay a little over Rs. 2 per day, what could not your people do in India, where you have the cheapest and best labour in the world?

Following is the letter referred to above.

The work been done this week on this place is the planting of rubber seed in the large nursery now being laid out near the banyan tree. We selected this place for the nursery on account of its excellent soil, being near to our next year's location for planting, and because there were about 15 acres of nearly level land, so necessary for making a good nursery.

The forests having been cut down by the contractor, and burnt, we went to work, cut up and burnt the remaining logs, then dug out all the small stumps, roots and creepers; after this stump pullers were set to work, with a good pair of strong oxen, with the yoke tied to the horns, Mexican fashion, they did excellent work, in fact saved the Company hundreds of dollars, besides tearing up the ground so much there was no necessity of digging it over.

The earth having been dug out from among the roots of the stumps, they were piled in heaps and burnt. After this the ground was levelled, raked over smooth, roads laid out; then the lines were laid off at right angles to the roads 18 inches apart, and just one inch deep. Rubber seed sown about one inch apart in the lines, and covered as soon as possible after sowing.

Any of the readers of the *Planter* having a fancy for figures they might find out the number of seed sown in this rubber nursery. Here is the sum:—The nursery is 15 acres in extent. Deduct for a road 8 feet wide, and 900 feet long. The lines are 18 inches apart, and seed sown one inch apart in the lines. Now, if one-third of the seed sown grows, how many plants will we have to plant out next season?

We also had a gang of men planting corn, of which we have about 160 acres planted, and seed corn enough to plant about 90 acres more.

I will explain to you the Mexican method of corn planting; the forests having been cut down and burnt for planting rubber, the lines staked out seven and a half by seven and a half feet; two lines of corn are planted between the lines of stakes, each hill of corn being three feet nine inches apart. Yesterday we had forty men planting. Each man had a stick about seven feet long sharpened to a point at one end. This was stuck into the ground about four inches. Three or four grains of corn were then put into each hole, and the corn planted. Nothing more is done to it till "breaking down," the ear season comes. If, however, the weeds become too high for the young rubber plants, they are cut down, thereby weeding corn as well as rubber. Your farmers of the West will naturally ask "how many bushels of corn does such outlandish planting produce." I will answer the anticipated question, and say the average crop is about 40 to 45 bushels per acre. We will send to the Chicago office a few ears from this crop, so that your people may see for themselve the kind of corn produced by this Maxican mode of planting. It is all right for *this country*. Corn planted 10 days ago is now 10 to 12 inches high.

We are going to sow a large cattle pasture with Paral and other grasses as soon as we get through with our coffee and rubber nurseries. In my next letter I will give details of the 5 acre rubber nursery we are going to plant out near the river, as well as the seven coffee nurseries already cut down and burnt; these have been selected near the land to be planted, as the system of "pilon" or ball planting is a very expensive mode of planting, seeing that 6 to 8 pounds of earth is carried with each plant from the nursery to the place of planting. I said above that the pilon system is expensive; it is, but it is the best in the long run. Last year's failures do not amount to over two per cent.; *i. e.*, not over two per cent. of the plants planted last year have died, we got no rain after the first week in February till the second week in June.—*Madras Mail*.

BREEDING FOR BEEF IN TRINIDAD.*

By C. W. Meaden,

Manager of the Government Farm, Trinidad.

It is a general belief in Trinidad that our native grasses are not sufficiently nutritious to enable the Colony to produce its own meet supply and particularly of beef. A sum of £40,000 is annually spent in the supply of meat, so that the question is one of sufficient interest to demand thorough consideration. From a purely agricultural aspect the production of beef would form an additional industry, and bring into a healthy and remunerative condition land which is now waste and a burden to its owners.

In order to bring our natural grasses into good grazing condition systematic treatment is required. Sub-division for the purpose of rest and change, and, where the formation of the land permits, the use of agricultural implements such as the hay-mower, horse-rake, and the harrow, should soon result in the formation of sound feeding pastures.

The present paper deals only with the conditions of Trinidad for the production of beef; that is to say, whether there is suitable land and other facilities, and sufficient inducement in the way of profit to encourage the industry.

That there is land enough is evident from the areas lying idle on abandoned sugar estates, and the great Caroni Savannah,—a menace to health

* This subject has already been dealt with by the author in two communications presented to the Agricultural Society of Trinidad, which form papers Nos. 98 and 131, in Volume III, pp. 119 and 310 respectively, of the Society's Proceedings. The information contained in the present paper summarizes and carries to a conclusion the history of these experiments. (*Ed.* W. I. B.)

and unproductive. With regard to facilities, there are good roads and railways cutting through what might be the heart of the industry. The market value of the product has already been shown, and a recent rise in the price of meat shows that, at present, there is little danger of oversupply. The present meat trade in Trinidad is open to serious interruptions which often renders it difficult to meet the demand, and the poorer people are deprived of meat in consequence. It is therefore very desirable that a reserve supply should be available, that the market should not continue in its present dependent position.

During the last year an experiment in breeding for beef was brought to a satisfactory conclusion, although only carried out in a small way. The subject of the experiment was a cross between a Red Poll sire and an ordinary Creole cow. This steer, when turned out to grass at fourteen months old, weighed 465 lb. He was kept under conditions such as might be expected would be given in the general way in the Colony, to test the value of grass feeding. The season proved exceedingly severe and grass was scarce. At two years old, he had gained only 83 lb. As grass became more plentiful a rapid increase in growth ensued, and at the end of his third year, he scaled 770 lb. showing a gain of 222 lb. for the latter period. This rate of gain would probably have continued so that at four years old have would, in all likelihood, have scaled 1,100 lb. the weight of a prime beast in Trinidad. The cost of rearing this animal amounted to $4:80 including milk and feed. The gain in weight during his last year cost two shillings, one shilling land-tax and one for upkeep of fences and land, calculated on the average cost of the herd of oxen running together.

The dead weight was 384 ib. The animal was in a perfectly healthy condition, every organ sound and, to use a butcher's term, "cleaned well." The meat was tender and juicy and altogether superior to what is generally obtainable, and realised in the open market, sold under the same conditions as any other beef, $32:28, which after paying for slaughtering, market dues and commission left a profit of $27:48 or $9:16 per annum. With a large herd, sufficient working capital, and sound management such returns indicate the possibility of a lucrative industry.—*West Indian Bulletin.*

LIGHTNING AND ITS EFFECTS.

The day after one on which a thunderstorm took place I came across a chir pine (*P. longifolia*), which had then been struck. The tree was mature, standing on the top of a hill, and he had no leader, which had evidently been broken or cut off in its youth. The lightning had struck one of the uppermost radiating branches and took a straight course for a short distance, when it encountered a branch which turned it off its course, and from this point the ditrection taken was a spiral one, the turns being closer together at the top of the tree, where there were more branches with the fluid avoided. About 5 feet from the ground the electric current encountered a swelling, evidently caused by the healing up of an old wound, and at this place it left the tree, joining it again about one foot from the ground. A strip of bark about 4 inches in width was removed the whole way down the tree where the fluid took its course. This strip was not removed in one broad piece, but in two slips of 2 inches each in width, for its full length, the division being exactly in the centre and quite clean. The length of the strips varied from 2 feet to 4½ feet in length some of them being found on the ground, whilst others remained on the tree, usually being fixed to it at their upper ends, the lower ones being quite free and curling outwards. The outer rough bark was totally removed, not a single piece remaining on the strips mentioned above. It was found lying in small pieces under the tree. In no case were any actual sings of burning to be found, although the long strips of underbark were dried and curled up with the heat, and neither the bark on either side of the course taken by the lightning, nor the needles at the foot of the tree where the current entered the ground were damaged in any way. Both the inner and outer edges of the strips of underbark were quite clean as if cut by a knife.

Curious to relate, down the whole length of passage a thin narrow layer on underbark was left, exactly in the middle, firmly fixed to the tree; of the blaze where the separation of the two strips took place and at the foot of the tree where the electric fluid joined it again, two distinct courses could be traced as if the fluid had become separated in its leap.

The tree I had cut down, and it was examined carefully. Judging from appearances it would seem that the lightning threw off, simply by shock, the rough outer bark which opposed its passage, thus uncovering the smooth underbark, over which the fluid passed uninterruptedly. The great heat dried up this underbark and turned the sap underneath it into vapour, which forced it up causing to divide at its centre, leaving the thin line of bark where the separation took place, caused also by the contraction of the underbark. The pressure underneath caused by the formation of steam, coupled together with the fact that the strips of underbark were quite shrivelled up and contracted, is quite sufficient to explain the clear way in which they were separated from each other and from the bark on each side of the course taken. There would appear to be no doubt that lightning, if possible, will avoid all serious obstacles by going round them, and this being impossible, it will either remove that obstacle or be broken itself into two or more currents by trying to do so.

It would be interesting to know if in any other parts of India ligbtning has been observed to have had similar effects as the above

E. RADCLIFFE, *Forest Officer.*

Camp Choch, Mirpore, Jammoo: February 8th, 1901
—*Indian Forester.*

CASSAVA.

We have had many inquiries since we wrote on the cultivation of cassava as to its commercial value, and with reference to the method of cultivation. Cassava is sometimes called Brazilian arrowroot. It resembles arrowroot in one respect, so far as manufacture is concerned, in that tubers are rasped, and the starch precipitated as in the case of arrowroot. There are two species of the plant (which is one of the Euphorbiaciæ)—viz., the Bitter Cassava, *Manihot utilissima*, and the sweet, *M. Aipi*. Both furnish highly nutritius food starches. The bitter contains a poisonous element, hydrocyanic acid (prussic acid), and, as a consequence, cannot be eaten in a fresh state, whilst the sweet variety may be used as a table vegetable without any preparation. The poison of the bitter variety is, however, rendered volatile by heat, after the application of which the juice may be safely used as the basis of cassareep and other sauces. In Brazil great use is made of the bitter cassava. The dried roots are rasped, and a kind of flour results, from which cassava cakes are made.

The plant is easily cultivated and finds a congenial home in Queensland. When the land intended for cassava is well broken up and reduced to a good tilth, the rows are laid off much in the same manner as for sugar-cane, but only 4 feet apart. The sets consists of portion of the stalk out into pieces about 6 inches long. Four inches is a better length, because the roots springing from the cut ends are those which produce the tubers. Like all other such crops, they must be kept clean. There is no need

for deep cultivation, indeed, shallow works is the best. A very fair profit may be made by growing cassava, as is shown by the *Florida Agriculturist*. That Journal, quoting from the *Leesburg Commercial*, says—

While there is no great big money in growing cassava, there can be reasonable profit made in growing it, and it is not subject to be killed out by the frost like some crops, for it is planted after the first frosts are over, and matures before the frost comes again.

The following information on this important subject is furnished us by Mr. George E. Pybus, of Fruitland Park, who has been growing cassava for several years. He estimates the cost of growing cassava as follows :—

	Per Acre. $		s.	d.
Ploughing	1·50	=	6	0
Harrowing	0·35	=	1	5½
Seed, planted 4 × 4, 2,700 hills, 6-inch pieces, 1,500 feet, at 12½ cents	1·70	=	6	11
Planting...	1·07	=	4	0
Six cultivations at 35 cents	2·10	=	8	5
Four hoeings at 1 dollar ..	4·00	=	16	0
Fertiliser, 350 lb. at 23 dollars per ton	4·00	=	16	0
	14·65	=	58	8½
Digging and hauling, say 1 mile	1·25	=	5	0
Value, f.o.b.	5·00	=	20	0
Net	3·75	=	15	1½
Necessary to make, say, 4 tons to pay expenses	14·00			

Leaving a net profit of 3·75 dollars per ton on all above 4 tons. Of course, two of the above items, cultivating and hoeing, may vary, but to make a success of the crop, it must be kept clean until it can take care of itself, and he believes his estimate to be a fair one. Notwithstanding the ill-luck which attended all who adopted fall planting, in 1899, he has just finished planting 10 acres, being determined to give cassava-growing as a farm crop a fair trial.

The resulting crops with good fertilisers will amount to from 6 to 8 tons per acre, and the digging can be done for about 2s. per ton. The cost of hauling will, of course, depend on the distance. On sandy soil it will yield more feed than any other crop that can be grown. For feeding pigs, horses, cows, and chickens no better crop can be grown. It will produce the best of pork and bacon; it will make excellent pastry and delicious breakfast cakes.—*Queensland Agricultural Journal*.

COMBATING SAN JOSE SCALE ON FRUIT-TREES.

At the present time San José scale is being found in many orchards, and although advice as to the best treatment has been given repeatedly in the *Agricultural Gazette*, many growers may have overlooked it, and are in doubt as to the steps to take to rid their trees of this extremely destructive pest. The scale itself is not unlike red scale in appearance, and during the winter months when the peaches, pears, plums, and apples which it chiefly affects are bare of leaves, the scale may be noticed on the wood of the trunk and branches. When the scale is picked off on the point of a knife a little yellow-coloured mass is seen inside. As the result of numerous successful trials the Fruit Expert is able to recommend a painting of pure kerosene for smaller trees and spraying with lime, salt, and sulphur for larger trees which could not be readily gone over with a brush. Before applying the kerosene the affected tree should be pruned, and the prunings burned. Then the kerosene should be applied so as to wet the tree but not trickle down to the roots; care to be taken not to miss any portion of the stem or limbs. It does not injure the buds, and apparently has little or no effect on the cuts.

The lime, salt, and sulphur wash is prepared as follows ;—

Formula :—Lime .. .. 30 lb. (fresh slacked)
Sulphur .. .. 20 lb.
Salt .. .. 15 lb.
Water .. .. 60 gallons.

Take 10 lb. of lime and 20 lb. sulphur, and boil them until throughly dissolved, then add the rest of the lime and the salt and water to make 60 gallons. Strain and spray when rather more than milk warm.

The only difficulty likely to be experienced [illegible] making up this mixture is in getting the sulphur thoroughly incorporated. To do this requires continuous boiling, with constant stirring, until the liquid is of a deep yellow colour. If it is possible, the sulphur should be first ground up with a small quantity of water into a paste, in the same way that mustard is made, so that tho grains of sulphur may be throughly wetted. This will greatly hasten the process, and if as much as 20 lb. of sulphur is to be used, this may be ground up a little at a time in a largish mortar and added to the boiling solution.

The best thing to use for boilling this mixture in is an enamelled vessel. If only a small quantity is made at a time, an ordinary enamelled preserving pan is the very best kind of vessel. In the absence of these, an iron vessel or an ordinary oil-drum may be used. On no account use copper vessels.

The actual manner in which the ingredients are added does not matter. It will be found best to slack the lime on a board in preference to slacking it in the vessels. Hot water is not necessary for slacking it.

The main point is that the lime and sulphur should be well mixed and thoroughly boiled together.

The action of this spray is to smother and destroy the scale and eggs. Some people scrub the bark of the trunk and main branches with a brush before spraying them with this wash.

This is a splendid spray for clearing trees of all sorts of pests that escape notice, and it is really worth while giving all deciduous trees in the orchard a spraying with it immediately after the annual pruning.—*Agricultural Gazette of New South Wales*.

MANURE FOR TOMATOES.

The Chemist, at the request of several tomato-growers in the Minmi district, has furnished the following information as to the best means of fertilising tomato and cucumber crops with dry and liquid manures :—

For Tomatoes.

A complete dressing for an acre would be—

		Costing about. £	s.	d.
Sulphate of ammonia...	.. 160 lb.	0	13	6
Superphosphate	...250 lb.	0	10	6
Sulphate of potash ...	..150 lb.	1	0	3
Total. ...	...560 lb. or 5cwt.	2	4	3

For Cucumbers.

		Costing about. £.	s.	d.
Dried blood	250 lb.	0	12	6
Superphosphate	235 lb.	0	10	0
Sulphate of potash	75 lb.	0	10	0
Total	5 cwt.	£1	12	6

This quantity will be rather much for an acre, the exact amount being 4½ cwt., which would come to about £1 10s. per acre.

Both the above formulæ are based on the actual manurial requirements of a crop of the kind mentioned in a soil of fair average quality. Where materials like well-conserved and rotted stable manure, fowl-yard sweepings, and wood ashes are available, the quantities of commercial fertilisers can be reduced ; but it must be remembered, especially as regards tomatoes, that the principal manurial requirement for good crops is potash, and the proportion of it in most of the manures that can be home-saved is very small.

The fertilisers mentioned may be used as liquid manure, by dissolving in water, though the best plan is to add in the dry state mixed with earth and to water the plants afterwards.

In the case of dried blood, this does not dissolve in water and would have to be added separately.—*New South Wales Agricultural Gazette.*

CASTOR-CAKE, CASTOR-OIL, AND CASTOR-SEED AND ITS PROPERTIES.

Many people are under the impression that the castor-cake contain 7 per cent. nitrogen and 12 per cent. of moisture, and is thereby considered a manure sufficiently lucrative for cheena barley and other *rabi* crops. Such is not the case. Castor-cake contains 11·86 per cent. of moisture and 5·23 per cent. of nitrogen and can be used for all purposes. Moisture is of very little consequence to the agriculturist, whereas, on the other hand, nitrogen potash and phosphoric acid are considered the most valuable ingredients in a manure, especially for leafy crops, and it is needless to say that the castor-cake contains all these properties, which renders it a manure of the very first class. The reason why it may be looked upon as a manure of the very best, is because it contains 2·53 per cent. of nitrogen, more than any other manure. We all known that potash, which forms one of its component parts, is by itself equal to any ingredient in a manure. Besides phosphoric acid, the other component part is in such a condition of chemical combustion as to be easily assimilated by the plant. Further, it may be stated that the cake contains a certain amount of oil. This oil in itself acts as a manure, and at the same time prevents the cake from decomposing rapidly in the ground ; thus allowing the cake a fertilizing action of more than a year. When once a person has studied closely and scrutinizingly the properties of the castor-cake manure, it does not take him long to testify to the effect it has on potatoes, wheat, oats, cheena and makai. If on eight biggahs of land you strewed 180 maunds of well pulverized castor-cake, and sowed this land with oats, you would find that your return would be 143 maunds or thereabouts, of good clear oats, with and exceedingly heavy crop of straw. Again, if you were to sow on 14 cottahs of this land dug out into trenches, Naini Tal seed potatoes, you would get a return of 82 maunds of crop from about four maunds of seed. After these two crops were cleared out, if cheena was sown, your return would be just as much. Again, after the cheena crop was taken up, if makai was planted on the same eight biggahs of land, your yield would be 122 maunds from not a very liberal sow. Thus in one year you have realized three substantial crops from the same piece of land without any trouble of manuring for each crop. This manured land will answer the following year without any trouble, to rear up another supply of the crops mentioned above, excepting that the potatoes this time will not be so large as on the former occasion. The husk obtained from the castor-seed, also, acts as a very good manure for flower-beds, but great care must be taken in the administration of it, as the ingredients with which this husk forms a manure, have a tendency to either burn up the plants or prevent them from budding. Too much cannot be said on this score, as the making of this manure is a secret. Another mistaken idea is that castor oil cannot be bleached. It can be done, and the process is very simple. Pass the oil through the folds, say two, of pure white blotting paper, and then expose it to the rays of the sun, under the cover a pane of glass. Oil of a reddish hue is of course beyond bleaching, as it contains a large portion of moisture, which is obtained from the husk. It may be remarked that castor-seeds are of various sizes, though more or less of the same shape and form. It will be observed that the smaller the seed, the more oil you get. Seeds of a large form generally contain very little moisture; as the shell, which is of an absorbing nature, derives its moisture from the kernel.

The foregoing statements may call forth comments from those in the manufacture of oil, owing to there being a keen competition in the trade, but reliance can be put on what has been stated above, as the statements to a certain degree are the outcome of the experience of the late Chief Engineer of the Sivan Oil Mills, Mr. Edward Austin Neame.—*Indian Planters' Gazette.*

COFFEE CULTIVATION IN THE FRENCH CONGO.

The following interesting particulars with regard to the cultivation of coffee in the French Congo, based on information supplied by the Director of the experimental Cultivation Gardens at Libreville, in reply to questions addressed to him by the "Office Colonial" in Paris, were given some time back in the *Board of Trade Journal*:

Liberian coffee is the kind principally grown in the French Congo, the cultivation of the San Thome coffee (*Coffea arabica*) being now almost abandoned. Kouilon (*coffea canephora*) and Oubangi (*coffee Chaloti*) grow wild, but the latter variety is now beginning to be cultivated.

The amount of coffee exported from the French Congo during the past four years was as follows:

	Kilos.
in 1896	4,471
„ 1897	30,094
„ 1898	57,660
„ 1899	41,281

In January, 1900, 30,473 kilogs., valued at about 33,500 francs, were exported. The coffee is exported in bags of from 50 to 70 kilogs each, the freight for coffee, unhusked, being 66 francs per ton of 1,000 kilogs. by the Chargeur-Reunissteamer from Libreville to Havre. The bagging in which the coffee is packed is imported from abroad. The coffee planters who are themselves merchants export their coffee to Europe themselves without the intervention of middlemen. Only a small quantity of the coffee is sold for local consumption, the retail price at Libreville being 2 francs 50 cents per kilog.

There are at present about 1,800 hectares of coffee plantations in the colony in bearing ; in addition about 150 hectares have been planted, but will not yield a crop till about 1905.

There is no export duty on coffee coming from the Gaboon district, but that produced in the conventional basis is dutiable at the rate of 5 per cent, *ad valorem* on a valuation of 60 francs per 100 kilogs. Note.—Kilog.=2·2 lb. Hectare=2·47acres, Franc=9 6d. —*Tea.*

RUBBER IN RHODESIA.

In a report received from North-West Rhodesia Major Colin Harding, the Acting Administrator, says:—

The indigenous rubber found in North-West Rhodesia is of three distinct species, which should be classed as: (1) Landolphia-Florida, (2) Kickxia-Elastica, (3) Capodinus-Lanceolatus. I will first take the Landolphia-Florida, which is a species of vine rubber in this country, growing to a considerable length, varying from 20 yards to 60 yards, and in size from ½ in. to 1½ in. in diameter. It is found growing usually in marshy tropical localities.

This rubber first came under my notice on a small tributary of the Zambesi, north-west of Nyakatoro, during my journey to the source of the latter river last year. Again I saw and collected portions of this vine in the same latitude, also found in a very marshy and verdant spot, on an east bank tributary of the Kabompo River, called the Mumbasi. This vine at the latter place was seen to perfection, extending round the adjacent trees, forming an impenetrable thicket, and affording, besides a lucrative employment for the native, a shelter and protection to the kraal which was built beneath its shade. I am forwarding samples of this vine for your identification. Judging from the quantities of prepared rubber which I have found in the possession of different natives during my journey, I am convinced that considerable quantities of this valuable species are found surrounding the majority of the numerous tributaries which flow into the Kabompo and Zambesi Rivers, or, to put it more concise and plainly, the Landolphia-Florida is found between the twelfth and fourteenth parallels, throughout the whole of Barotseland.

The mode of collecting and preparing the Landolphia-Florida is similar to that adopted by the natives when making the ground rubber into a marketable commodity. Without thought for to-morrow, they promiscuously hack and cut the vine, selecting, when their work of destruction is complete, the best and largest branches only, leaving the smaller, which in another year would have attained maturity, to rot on the ground. Divided into various lengths of from 3ft. to 4ft., the vine is taken to the kraal where, after forty-eight hours' coutinual soaking, it is hammered and pounded with the idea of removing the bark, which secretes the rubber from the stem; this process complete, the rubber—or blanket, as it is termed—is again immersed and continually boiled for three or four days, or, in fact, till the bits of bark are completely removed. In examining a piece of vine rubber before boiling, you would find no aluminoid or resinous matter. The rubber seems a part and parcel of the bark, and, unlike Kickxia-Elastica, the juice could never be extracted by incision or tapping. The boiling operation being complete, the rubber whilst warm is rolled into sticks about 6 in. long, called matallas. It is then hung under the various roofs to dry, and later made up into chetotes, ready for Mombari traders, who periodically visit the kraals to purchase and transport this valuable product to the West Coast. Whilst on my tour I purchased several chetotes of rubber, for which I paid two yards of calico, each valued at 1s. 8d. per yard, on the spot. The weight of a good chetote should be about 2 lb., and the price of this class of rubber at Benguela would run from 1,800 to 2,000 reis, or in English money from 2s. 9d. to 3s. 6d. per lb.

(2.) Kickxia-Elastica.—My knowledge of this rubber, which I have set down as Kickxia-Elastica, is very limited. Undoubtedly it is a true rubber found in the same districts and in close proximity to the Landolphia-Florida described above. Several samples were shown to me when east of the Kabompo; also I inspected the same species of rubber in the possession of natives north-west of the Zambesi, near the Kasi River. It is of a superior quality to either of the other two kinds, and as it is procured by an incision made in the trees, it is absolutely free from all dirt and bark, the only damaging ingredient being grease, which is infused by the natives whilst collecting and rolling it into various shapes. In selling the inferior species of rubber the natives will mix the Kickxia-Elastica with other unsaleable root rubber. I saw a rubber much resembling the Kickxia-Elastica at Kota-Kota, some two years ago, the only appreciable defference being, as far as I could see, the different shapes in which it was rolled.

(3.) Capodinus-Lanceolatus.—Accepting Sir Willam Dyer's authority, the third and last species of indigenous rubber which I am about to describe must be the Capodinus-Lanceolatus. Its description as being worthless is, I think, unwarranted. On the contrary, I have seen Capodinus growing, prepared, and finally sold at good and remunerative prices, although admittedly it is of inferior quality, still it is a rubber that thrives in the soil where no other root could exist, and will, with an ordinary amount of care in collecting it, eventually prove a valuable asset to Western Barotseland. To substantiate my statement, I might point out that already, both east and west of the Kwito River, the Portuguese have erected stations and conducted trading expeditions for the object of collecting this rubber, and apparently for that object alone. Again, at Katende, a large village situated some sixty miles north-west of Nyakatoro, and well within the boundaries of King Lewanika's kingdom, during the last two years no less than ten waggons have penetrated to the heart of that country for the object of collecting and transporting this rubber to the west, and I am led to believe that these expeditions met with an ordinary amount of success. The Capodinus-Lanceolatus is found in considerable quantities between the Kwando and Kwito Rivers, and also west of the latter. At the head waters of the Luugwe-Bungo and in the Balachazie country its growth is also noticeable; in fact, the whole Barotse country west of the East Lunga River, above parallel 15, is dotted with portions full of this indigenous root. The process of manufacturing and preparing this root I have described under the heading of Landolphia Florida. Strange to say, the root of the Capodinus-Lanceolatus and a portion of the Landolphia vine are, when gathered, so alike that only the most competent judge could correctly define the species. This Capodinus is phanelogamous, growing from 6in. to 10in. in height. The roots are found about 4in. under the surface of the soil, and, spreading themselves evenly and uniformly, cover a considerable quantity of ground. At present this plant is so plentiful that in rubber districts the natives collect only the larger roots, leaving the smaller exposed and perishing under a tropical sun. The surface, after the natives have collected their rubber, resembles an orchard or meadow which has been upturned by a grub-seeking hog. For two or three years the production of rubber from such a spot is nil, and treated on similar lines to his garden, the native never returns for a second crop, but seeks pastures new, where the same work of destruction is carried on in the same reckless and extravagant manner. It is useless disguising the fact that, with one or two exceptions, the most prolific and thriving rubber districts are found outside of the present provisional boundary, and until the question of demarcation is satisfactorily settled, the idea of preserving or encouraging the production of rubber in this country to any great extent is out of the question. In the meantime, whilst we are arbitrating and settling the boundaries, the Portuguese are extending their power to within 100 miles west of Lialui, destroying districts which beyond all doubt must eventually come under the control of the Chartered Company.

The fact that North-West Rhodesia is a rubber-producing country has been proved beyond doubt, although the full extent is yet unknown. Each

journey has resulted in further ocular demonstrations, and I am convinced that the more we see of this country the more we shall become confirmed in the knowledge of the existence in considerable quantities of this valuable plant, which only awaits the early settlement of the boundary question, the prevention of the slave traffic, and the establishment of police posts, to secure a successful future for the development of the rubber industry.—*India-Rubber Trades' Journal.*

CINCHONA AND QUININE IN JAVA.

The following is based on an interview with and memoranda supplied by Mr. F. L. Seely, St. Louis, Mis., in regard to his recent journey of investigation in India and Java. The illustrations of Java scenes are reproduced from photographs taken by Mr. Seely.

Java is generally supposed to have come later into the cinchona-field than Ceylon and India, and some say that Java started where the British dependencies left off—not an uncommon thing with Britain's trade-rivals. But this is scarcely the case. As early as 1829 the cultivation of cinchona in Java was mooted, but it was not until 1852 that the Dutch Government sent Hasskarl, who had been director of the Botanic Gardens at Buitenzorg, to Peru and Bolivia, where he got with much difficulty seedlings that he took to Java, but these did not come to much. In 1855, Dr. Franz Junghuhn, an eminent Dutch botanist was sent to Java with a number of seedlings, commissioned also in the following year to superintend tho cinchona culture. Junghuhn was one of the most diligent workers in the field up to sixties of the nineteenth century, indeed, by the end of 1860 there were about a million cinchona plants in Java, but 939,809 were the comparatively valuless *Cinchona Phudiana*, which had been propagated from the seeds of *C. ovata* brought from South America by Hasskarl, and renamed after Pahud, Governor General of the Netherlands India. Dr. J. E. de Vrij was sent out to Java in 1857 as a chemist, but he was really the man who recognised that the future of cinchona-cultivation in Java depended upon the adoption of the particular kind of calisaya that Charles Ledger had obtained in South America and which is now known by the generic name of the man who risked his life to get the seed. Ceylon and India might still be the centres of profitable cinchona-cultivation had the British Government realised that Ledger's work was the consummation of a long and expensive inquiry; but the Dutch Government, thanks to De Vrij, was sufficiently fortunate to try the new seed well, and within twenty years planters had proved that *C. Ledgeriana* (at first regarded as a rich calisaya) is the tree best worth cultivating. De Vrij's great service to quinology was the early recognition of the necessity for cultivating plants with a high quinine yield.

The Island of Java is only 673 miles long and about 125 miles wide. About 25,000 acres of the Island are under cinchonas. There are 25,000,000 natives in the Island, and only two of them speak the English language. The first thing Mr. Seely did was to secure the services of one of these men, whom he kept through his visit. He was a very accomplished young man, and somewhat of an aristocrat as compared with his countrymen. His main accomplishment lay in the fact that he had two wives, and he claimed that for a man to be a sincere Mahomedan he should have four, if his means permit. He explained to Mr. Seely, however, that one wife did not know of the other's existence, and he was quite confident that matters would run somewhat smoother if he maintained that ignorance on their part. The day after Mr. and Mrs. Seely arrived they proceeded to Bandong, which is about eight hours' ride from Batavia, at which port they landed. It is a delightful little town of about 1,000 Europeans and probably 60,000 natives, and the hotel was as comfortable as any one could hope for. Nearly all houses in Java are one storey high, and, in the case of hotels, only one room wide, and sometimes a mile long. This is to prevent serious injury in case of earthquakes, which are common out there.

After resting for a few days Mr. Seely made trips to the plantations, which lay in different directions around Bandong, ranging from 9 to 30 miles distant, all of which had to be covered by pony-carts, pony-back, or in mountain-chairs each carried by four natives. Cinchona was seen growing in all its stages, beginning with the seed and the little plants just above the ground, to immense forest trees which have been allowed to grow for nearly half a century, and some of which are 100 feet high, and could not be spanned more than half-way round by the embrace of a full-grown man.

Over 20,000 trees grow from Ledger's seeds, and a large number of the trees are still standing, as is evident from one of the photographs. These trees have been allowed to go to seed, and are simply used for their seed, as they are now about 45 years old, and a tree is harvestable at six years.

The seed is planted in what is known as the nurseries (see page 165). Both Ledger seed and succirubra seed are planted. When the latter seedlings grow to a height of about 3 feet they are cut down close to the root, and a Ledger shoot about 6 inches long is grafted to each. This is covered up with wax and bound with a piece of banana-leaf, whereupon, after a short time, the wound heals and the little Ledger shoot comes out in leaf; then the tall top of the little succirubra tree is cut off, and we have the completed combination ready to be transplanted in the forests. This is one of the most important events in the life of the cinchona-tree in Java—the bit of scientific culture which has enabled Java to outstrip the world in cinchona supply. It is done because the Ledger plant does not grow well in the soil, while the red-bark tree flourishes exceedingly. It is a wise procedure to graft the rich ledger top on the poor succirubra-root, for the Ledger bark is so rich in quinine that as much as a fourth of the weight of the dry bark has on rare occasions been quinine sulphate.

The so-called cinchona "forests" are clearings made from the jungle, and the ground is kept clean from weeds and rubbish by diligent gardening. The trees are planted in rows systematically, and the ground is so worked that the rains penetrate to a great depth. The trees are allowed to grow until the sixth year, when they are ready to be harvested. The old system of harvesting was to peel the bark of the trees. This is no longer done, but each tree is sawed off at the roots, divested of its bark, and a new tree planted near by. It has long been a familiar *canard* in commercial circles that the Java planters had tired of their work, and were uprooting the trees in order to put tea in their place. It will be seen that Mr. Seely's observation proves exactly the opposite; the uproot because it pays. The new trees grow to the harvesting stage nearly as soon as the bark would grow on again, and the trees are much richer in quinine than renewed bark.

After the trees are hewn down and cut into short lengths native woman beat the bark off the pieces. The wood is dried and used to heat the ovens in which the bark is dried. The drying, however, is largely done in the sun before the bark is put into the ovens, and the quilled or pharmaceutical bark is usually dried entirely in the sun, the native women and children sitting in the drying-trays and tying the bark into pipes while it is green and pliable. After the bark has been thoroughly dried it is coarsely ground, usually by water-power, and it is then packed tightly in bags of 100 kilos. each; these bags are sent to Amsterdam (90 per cent. of the Java bark going there), and the remaining 10 per cent, is manufactured into quinine at Bandong,

This 10 per cent. yields 1,000,000 oz. of quinine per year, and will very soon be increased to 2,000,000 a year.

Mr. Seely found the Java quinine-factory to be particularly attractive, as his own business-interest in quinine is equal to the annual output of the factory. It was a surprise to him to find so finely equipped a laboratory, and especially to receive from managers and owners such courtesy as belied the current tales of mystery about the Bandong works. Most people know that the manufacture of quinine has always been treated as a very profound secret, and probably there is not a quinine-factory in the world, outside Java, where a stranger would be permitted to learn anything of the process of manufacture. For this reason it was naturally difficult for the Bandong works to secure chemists who were conversant with the manufacture of the article, particularly on account of their being so far removed from civilised countries where chemists usually are found. In the first instance, the Bandong factory was placed in the hand of a man who was not familiar with the manufacture of quinine, though he had had a large experience in sugar-making, and was otherwise a man of scientific attainments, so the quinine first produced was not up to commerical standard. The enterprise went through a trying experience for about three years, and, although it was a hard struggle, it continued to exist and to manufacture quinine—such as it was. The owners were fortunate, however, in securing the services of Dr. A. R. van Linge, who had studied under Dr. de Vrij, as manager and head chemist for the Bandong factory. He is the moving spirit of the enterprise now, and not only has he perfected the processes of manufacture, but has invented and personally supervised the construction of the machinery and apparatus used in the works.

Mr. Seely saw about 4,000 oz. of quinine made per day, which he could not distinguish when placed among the best-known European brands, and, in addition to this, every lot of quinine the factory manufactures is tested by the director of the Government plantations, and he was present at one of these examinations, where he saw for himself that the samples were above the requirement laid down in the Pharmacopœia. The quinine is sold at open auction.

A word as to the process of manufacture. When the bark reaches the factory every parcel is assayed, and the natives mix the various lots so that an average strength of alkaloid is represented in each day's work. Tons of bark are ground up every day and sifted by very improved machinery, after which it is moistened with an alkali and pumped into immense digesters containing hot crude petroleum. There are agitators inside the digesters, which mix the bark well with the oil, and the oil extract the alkaloid which the alkali sets free from the bark. The bark is then allowed to settle out and the oil is decanted off and washed with sulphuric-acid water, which again takes the alkaloid from the oil. The oil is returned to the storage-tanks to be used over again. The crude quinine sulphate crystallises from the hot solution as it cools, and is afterwards purified by recrystallisation, the mother-liquors, of course, being worked up too. It is a beautiful sight to see the immense rows of big porcelain crystallising-pans, hundreds in number, full of the crystallised sulphate, which looks like snow in water; and it was a delight to Mr. Seely to run his hand down through the solid crystals and squeeze the water out as one would in making a snowball.

After the crystals have formed in the pans and the solution is throughly cooled, their contents are dumped into centrifugal extractors, which throw the water out and leave the quinine sulphate nearly dry. The last crystallising solution (distilled water with a trace of quinine sulphate in it) is returned to this main building through underground pipes, sulphuric acid is added to it, and it becomes the first washing-solution as above described. The quinine is then taken out of the centrifugal machines and spread upon trays to dry. Nearly every druggist knows that quinine sulphate should contain between 14 and 16 per cent. water of crystallisation. One of the most delicate operations in the manufacture of quinine is to produce the article without too much or too little moisture in the finished product. The Bandong factory follows a process, invented by Dr. van Linge, which enables the workers to regulate the air and other conditions in the drying-room, to the extent that the product exactly meets Pharmacopœia requirements.

After the quinine sulphate has been properly dried it is accurately weighed, under the supervision of a European chemist, like all other operations in the laboratory. The photograph of the operation of packing the salt in the tins shows the chemist whose duty it is to look after this part of the work.

The crystallising building, in which all of this work is done and in which no manufacturing operations are carried on except the purifying and crystallising of the quinine sulphate, is the most perfect specimen of absolute cleanliness Mr. Seely has ever seen. The floors are covered with porcelain-finished tiles, which are kept as clean as dishes, and he noticed that if the smallest dripping of solution was spilt on the floor it had hardly landed before there was a native after it with a cloth. The machinery and apparatus are kept in prefect order, and even the porcelain-lined crystallising-pans are washed with soap and water every time the solutions are changed. Cloths are stretched over each row of pans to keep out the dust and light.

The quinine sulphate, after being put into tins, is sent to the stock-room, where it is put in cases which are manufactured by natives on the ground. After the goods are placed in the cases, a sample is extracted from each lot that is represented in the finished product, and the director of the Government cinchona-plantation, who has spent twenty-five years in the service and who is a disinterested party, comes to the laboratory and applies the pharmacopœial tests to every sample.

The quinine then goes to Batavia, the principal business city and port of Java, where it is sold at public auction about once a month. The factory owners have no interest in the sales, as they do no business except with the planter himself, who pays the factory a stated sum (8s. for every 35 oz. for manufacturing costs), for it must be borne in mind that the planter owns the bark, and sends it to the factory simply to have the quinine taken from it, which is done on a guarantee that he shall receive the quinine that the bark assays, and he is at liberty to have assays made on his own account before he sends the bark to the factory. The quinine which comes from the bark belongs to the planters until it is sold at public auction. The factory owners have agreed not to enter into the manufacture of quinine on their own account.

The auctions in Batavia are carried on by Messrs. Tiedeman & Van Kerchem, the oldest-established bankers in Java. The quinine is bid for by various brokers, who act for any one that wishes to employ them, and who charge a stated commission for their work, but do not speculate. So strict are they with the auctions that a broker must mention the names of the persons for whom he is purchasing. The quinine is then shipped to various parts of the world.—*Chemist and Druggist,*

NOTES ON PRUNING.

By A. Despeissis.

Numerous enquiries reach the Department of Agriculture every season on the matter of pruning. The subject has already been discussed with detail in previous publications, and to Parts 4 and 5. Vol. V., 1898, of the *Producers' Gazette and Settlers' Record* I must refer those in search of more definite information on this subject.

Of the methods of pruning, there are two practised in the orchard, viz.; winter pruning and summer pruning. In the course of these notes, the first method alone will be considered.

Several objects are aimed at when pruning. It helps to control the growth of the plant and train it in such a way that the operations of cultivation, of treating and dressing the trees and vines whenever required, and of gathering the fruit, are made easier and more economical. It equalises the wood and fruit capacity of the tree, checking the one to favour the other if need be, suppressing rank growth of the boughs or limiting the productiveness of the plant in such a way that the quality is not affected by the excessive quantity of the fruit crop.

It checks the growth of suckers, water sprouts, and unsightly knobs and enlargements along the stem and branches; it tends to keep the plant in a thriving and healthy condition, promoting the growth of luxuriant foliage which tend to shelter he fruit and limbs from sunburn.

Pruning Outfit.

The tools required for pruning are few, but it is essential that they should be of the best quality and of a type suitable for the work to be done. It is also essential that they should be kept in good order, sharp and smooth, as a jagged or a blunt blade will inflict upon the wood bruises and injuries which will either cause the sap to sour and the limb to die back or will delay the healing of the wound and thus leave a door open to the entrance of the fungi of canker and other moulds productive of rot and decay.

Secateurs, or pruning shears, are easier to handle than the pruning knife. They do the work quickly, neatly and without giving a jerk to the branches of fruit trees and vines as does the pruning knife.

The first illustration represents Rieslter's Secateur, which can be procured in Perth. It is sold with a duplicate blade made of well-tempered steel, the tool is made of chilled steel, the tool is 9 inches long, strongly made and well finished.

The second illustration shows two types of secateurs and a handy pruning saw. The longer pruning shears, 15 to 17 inches long, is a two-handled one and a very powerful tool, suitable for pruning strong vines and hard and knotty wood. One of its handles is chisel-shaped and is found very convenient for suckering vines or trees, an operation which, when made with the blade, jags its edge and makes it blunt.

The edge of the blade of the secateur should be kept sharp by the use, whenever required, of a small hone or an oil stone, while the file will keep the teeth of the pruning saw well set.

When using the secateurs a clean and neat cut is given by seeing that the blade, and not the prong, faces the part of the wood which is left on the plant. As strong branches as can well be inserted between the blade and the prong can with little effort be snipped by gently pushing the top part of the branch or rod it is intended to cut away from the operator and against the prong side of the secateur.

The pruning knife, if kept sharp, will, in the hands of an experienced pruner, do very good work, and makes a very clean cut, which soon heals over. The blades should be strongly made, of the best steel, and with a beak curved at a sharp angle. A rough buckhorn handle will ensure a good grasp in the hand while in use; the blade, well-ground, will be found useful for trimming and paring the wound and giving it a smooth face after sawing.

To the other tools and appliances described, the following two will be found of great use when high trees have to be pruned and handled:—

This long pruning shear, mounted on a light pole about the size of a broom-stick, six to eight feet long, is a very handy device for reaching to the tops of the higher trees. It is found at the leading ironmongers.

An orchard ladder, properly constructed, is a very handy appliance when pruning trees and gathering fruit.

Orchard ladders of several designs are made. Some consist of a pole of a fibrous kind of timber, such as stringy-bark, bound with a strong band of hoop-iron a foot or so from the top end; this will prevent the pole, which is sawn to that point, splitting when the two lower ends are stretched and the rungs fastened.

Hinged, four-footed step-ladders, like the one here illustrated, are, as a rule, clumsy appliances, which are inconvenient on hillside or uneven ground besides being heavy and easily dislocated. Those found ready-made for sale in shops are often so lighty made as to be of little use in the orchard.

Varnish or wax paper is found useful for preventing wounds, caused by the removal of a large limb, cracking and decaying owing to exposure; it also promotes a more speedy healing. For that purpose gum shellac is often used. It is made by dissolving in a little strong alcohol as much gum shellac as will make the varnish of the consistency of paint. This varnish is kept in a well-corked flask, with a mouth wide enough to admit a brush, and is thus always ready for use. It is applied over the cut surface, well pared with the knife. Other good coverings for wounds made in pruning are also common white lead paint, grafting wax, coal tar, in the order named. The last-named is often a hindrance, while pine tar is even somewhat detrimental to healing.

Cutting to a Bud.

It is important before cutting off a branch of a tree or a rod of a vine to make sure that the last bud left on the plant, and which is intended to prolong the growth of the plant, is a sound, plump one, likely to grow, or whether it has accidently been rubbed off or otherwise destroyed. Such a terminal bud should be a leaf bud, and not a fruit bud.

Leaf buds differ from fruit buds in being more elongated, flattened, and more pointed in the same species of plants; they are either single, or give growth to single shoots, or double and even triple, when grouped in small clusters, two or three together, as in the case of stone fruits, they produce either leaves or branches.

Fruit buds are distinguished from leaf buds by their rounder and fuller form, the scales that cover them are broader, and they begin to swell and burst open earlier in the Spring.

Fruit buds are also single, as in the case of apples, pears, quinces or single, double and triple, as in stone fruits and berries. They are, besides, simple or compound; that is to say they produce but one flower, as in the peach, nectarine, almond, and apricot, or two or more flowers, in clusters, as in apples, pears, plums and cherries.

All buds are leaf buds when first formed; some at a later stage develop, either by being allowed to mature naturally or by artificial means, into fruit buds. Many trees develop their fruit buds towards their terminal shoots, unless these are cut off, when those left at the base of the branch, or along it, are thus excited into growth, and transformed into lateral fruit buds.

When cutting to a bud a slight slant is generally given to the cut, at a place close to the bud, although in so doing it is advisable not to approach the bud too closely, nor on the other hand leave above it a useless stump, which might engender decay; a piece of wood about an eighth of an inch above the bud is sufficient to leave. In the case of the grape vine the practice is often to cut though the joint, above the last bud it is intended to leave on the spur, as shown at C2. A longitudina section of the young wood of a vine shows in each joint a tubular cavity filled with pith; at each joint or node that tube is closed, as in the case of the

bamboo, and if the section is made at C1 that pith dries up and the bud below is at times endangered. The section should be made either at C or at C2 as shown on the fig., and never at C1. The buds B. are those left on the spur. D is an axillary bud which often fails to shoot. E is a piece of the previous season's wood.

WHEN BEST TO PRUNE.

For the winter pruning of deciduous trees, May, June, July and August are the best months. Pruning may be started directly the wood is ripe, when the leaves fade and begin to drop off. It is recomended to give to apricots and cherries a preliminary pruning in the late summer, after the crop has been gathered. Trees thus pruned are less subject to gumming and dying back, and the leaf buds have thus more time to transform into fruit buds, and to perfect themselves.

As a rule older trees are ready for pruning before younger ones.

In frosty localities, where stagnant cold air hangs about hollows and gullies, it is advisable to delay the pruning of vines, peaches, and plants whose sap moves early, until later in the season. This delays the period of active growth, and may save the crop. As regards the grape vine, late pruning is, if anything, also preferable to early pruning, in respect to yield of the crop and earliness of the period of maturity; but of course where wide areas have to be gone through, it is not possible to delay until the right moment this operation.—*Journal of the Department of Agriculture of Western Australia.*

SOME RECENT INVESTIGATIONS IN THE CHEMISTRY OF AGRICULTURE.

A Lecture delivered on College Day at the Saidapet College of Agriculture, Madras, by Dr J. W. Leather, Ph. D., F.I.C., &c., Lecturer at the Imperial Forest School, Dehra Dun, N.-W.P

When you did me the honour to ask me to read a paper on College Day, I thought that I could not well choose a more suitable subject than the one which has been announced, namely, a brief account of some of the recent work on the chemistry of agriculture.

As a matter of fact, however, I have found it impossible, without unduly occupying your time, to deal with more than one or two subjects, and I have had to leave unnoticed the greater part of the very extensive work which has been done on vegetable physiology.

SOILS.

There is perhaps no subject which has claimed the attention of the agricultural chemist more than the soil, and there is certainly no subject which is more deserving; at the same time it is one of the domains of agriculture about which, if we have learnt much in the past, we have much to learn in the future.

Playfair when editing Leibig's Agricultural Chemistry, expressed surprise that the chemist of that day should be content with the determinations of the amount of silicates and iron and alumina, leaving the potash, phosphoric acid, &c., undetermined. It was a comparatively simple matter for the chemist to free himself from this criticism, and he proceeded to determine the amount of the valuable plant foods, the lime, potash, phosphoric acid and nitrogen, with very great precision. This told us how much of these ingredients were in the soil.

As years passed on, it became evident that, valuable as this information was, it was insufficient. The chemist would find what appeared to be only a small proportion of potash or phosphoric acid, whilst if a manure were given to supply the deficiency, it might happen that the crop did not respond to the more liberal treatment in such a measure as one might have expected. Or, conversely, it was found that whilst a few tons of farm manure, or a few hundred pounds of more concentrated artificial manures, would have a remarkable effect on a crop, the actual amount of plant food contained in such manures, was far less than the soil itself contained.

One explanation of this was provided by the teachings of the field experiments at Rothamsted, which showed clearly enough that all crops have not the same requirements. It was found, for instance, that the cereal crops were particularly effected by a nitrogenous manure though at the same time it paid to give them mineral plant food also. Turnips and Mangels showed that if the supply of phosphoric acid were not liberal, they felt it keenly, and returned, for an application of comparatively small allowances of super-phosphates, a largely increased crop.

The third class of plants which fills an important place in English agriculture, namely, the Papillionacæ, behaved again differently, and often refused to grow at all in a field, however liberal the supply of manure might be. The latter is for several reasons perhaps not quite so suitable an example as the two former, but the evidence, as you will see, went to show that the methods employed by the chemist in the analysis of soils, were by no means perfect.

One fact that appeared very striking was that soils, which either appeared poor from the chemical analysis, or were actually known to be poor agriculturally, contained admittedly very much more plant food than several, or indeed many, crops required. It was known that at the most, a good crop only required a few pounds, 10, 20 or 30, of potash or phosphoric acid, whilst on the other hand soils rarely contained less than 1 per cent. of either of these plant foods, usually indeed more than this, and such a proportion amounts to no less than about 4,000 lb. per acre in the surface soil, to say nothing of the stores which the sub soils were known to contain.

It was clear that all this plant food could not be equally within the reach of the crops, that some portion of it must be in a different state of combination to another, the plant being able to assimilate the one more readily than the other. One commenced to speak therefore of "readily available plant food" as distinct from that which was not so.

Whilst a recognition of such a difference was easy, and the problem to be solved made clear, the method of differentiating between, say the portion of the phosphoric acid which the plant could readily utilise, and that other portion of the same material which it could not, was by no means clear.

Ville offered a method, which was at least roseate on the surface. He said, why not divide the land to be examined into plots, and to one plot give all the valuable plant foods excepting one say phosphoric acid, to another plot give all the several plant foods excepting another, say potash, and by providing a series of manures each deficient in one particular food, surely, will not such a method enable one to tell, from the weight of crop raised, what the soil is deficient in ?

The Rothamsted experimenter, had however shown very clearly that one cannot accept the answer which one sort of crop might give, as being that which would be given by another sort of crop. And furthermore, that in the case of field experiments with crops one season is not sufficient to provide a definite answer, that, indeed the experiment must be repeated at least a number of times before one can eliminate from it the influences of season, and the original inequalities of the land Such a method then becomes impracticable, for the farmer does not wish to wait years before he knows what sort of manure to apply to his crops.

Latterly, Wilfart has experimented upon the value of another method, based on somewhat similar lines. He raised the question whether, supposing a crop say of wheat, be grown in a soil which is deficient

in some one food, will the grain have a normal composition, or will it prove to contain less of the element in which the soil is deficient, than is common to it? Whilst the stems and leaves of a plant vary very much in composition, that of the seed remains usually very constant, and the question was, would grain produced from a soil deficient, say in phosphoric acid, be itself deficient in this substance? He has therefore tested this question by growing plants in pots of the particular soil under examination, to which manures of different composition were added. After the grain was perfected, he has analysed it to see if, from its composition, the deficiencies of the soil might be detected. The work is comparatively new and is probably still incomplete, but the last paper published indicated that whilst the method might be used for one particular crop, any one soil would have to be tested in relation to its value for each crop separately. This naturally entails a very great deal of labour.

The foregoing relates to methods in which it has been sought to utilise the services of the plant itself to answer the question—"In what respect is this or that soil deficient"?

I turn now to the question of applying tests in the chemical laboratory.

Some investigators, more particularly in Germany, attempted to apply certain dilute solvents to the soil, which might provide a measure of the available plant food.

Such a method has a great advantage over any cultivation experiment, because it can be accomplished in a short time. On the other hand, many considered that such tests were unsuitable. If the chemist takes a portion of soil and submits it to any treatment, he is submitting the *whole* of that portion to a like treatment. The roots of the plant, on the other hand, do not come in contact with more than a certain limited number of soil particles.

About ten years ago Dr. Dyer of London took up the matter in a somewhat different manner.

The *agricultural value* of some of the experimental fields at Rothamsted was known with great accuracy. Here a plot of land was known to be deficient in phosphoric acid, there another which was with equal certainty deficient in potash, and Dr. Dyer raised the question whether it might not be possible to find a chemical standard which, though more or less arbitrary in itself, would have a definite relation to the known qualifications of some of the Rothamsted soils.

Dr. Dyer's method of procedure may be stated very briefly. It may be assumed that much of the food of plants exists in the soil in a more or less insoluble state, and that it is rendered soluble by the action of the juices of the roots, which are acid. The amount of such acidity was therefore determined in the roots of a great number of plants, and from the result of this investigation an artificial acid solution was prepared. This resembled more or less the root sap. Dr. Dyer then allowed this to act on certain of the Rothamsted soils for a given time, and determined the amount of potash and phosphoric acid which has been dissolved. In order to illustrate the result obtained, the following may be quoted:—

Proportions of "readily available phosphoric" acid in Rothamsted soils.

Thirty-nine crops of Barley had been taken off the land.

Manures used per acre.		Yield, 1890. Bushels grain.	% of readily soluble P_2O_5
Plot 1—O.	Unmanured continuously	13	·0055
2—O.	$3\frac{1}{2}$ cwt. super-phosphate	16·75	·0463
1—A.	200 lb. ammonia salts	24·5	·0060
2—A.	200 lb. ammonia salts and $3\frac{1}{2}$ cwt. super-phosphate	33·5	·0425
1—AA.	275 lb. Nitrate of soda	29·5	·0067
2—AA.	275 lb. Nitrate of soda and $3\frac{1}{2}$ cwt. superphosphate.	47·5	·0350

In this statement is set out in the first column the manures employed on the different plots, and in the second column the yield of barley per acre in 1890, that being the thirty-ninth crop. The effect of phosphates will be readily perceived. Plot 1—O, which has always remained unmanured, yielded 13 bushels, the next plot manured with phosphates yielded $16\frac{3}{4}$ bushels. Similarly, from plot 1—A manured with ammonia salts, $24\frac{1}{2}$ bushels were reaped, whilst an addition of phosphates raised the yield to $33\frac{1}{2}$ bushels. The third pair of plots yield similar evidence. 1—AA, manured with nitrates yielded $29\frac{1}{2}$ bushels, whilst an addition of phosphates effected a yield of $47\frac{1}{2}$ bushels.

It is clear, then, that plots 1—O, 1—A, and 1—AA were all in need of phosphoric acid.

When these several soils and others also, for I only give here a small extract of Dr. Dyer's work in order to illustrate his method, were treated with a dilute solution of citric acid, it was found that these soils yielded the proportions of phosphoric acid which are found in the third column of the statement. From these figures you will see how very great is the difference between the amounts of readily available phosphoric acid in the soils of the several plots. Where barely had been grown for a long series of years without phosphatic manure, the proportion of readily available phosphoric acid had fallen to a very low figure, ·005 or ·006. Where phosphates had been annually applied to the land the proportion was many times greater.

The deduction which Dr. Dyer made, was that, if a soil contain less than ·01 per cent. of readily available P_2O_5 or less than ·005 per cent. of readily available K_2O, such a soil is probably in need of an artificial supply of this plant food.

It is very desirable to bear in mind that this standard is not one made arbitrarily by Dr. Dyer, but one which was indicated by the Rothamsted soils.

It did not however follow that a standard which was applicable to Rothemsted soils would be equally applicable to soils generally. The method has been since applied to soils in other parts of the world, and apparently it has a remarkably uniform value. In India I have had a like experience. Applying it to the soils of the different experimental farms, it has shown that at Poona, Nagpore, Cawnpore and Dumraon these is rather more than the ·01 per cent. of available P_2O in the soil, and at none of these farms have bones proved of material value as manure. On the other hand, the soil at Burdwan contains a low proportion of phosphate, and it is only at this farm that bones have proved of any value.

The evidence which has been gained in England with Dyer's method has gone to show its general applicability for the determination of the soil's requirements for potash as well as for phosphoric acid.

In India no manurial experiments has been made at the Farms to test the question whether the soil is in urgent need of an artificial supply of potash, but I may mention that most, if not all, these soils contain more available potash than what, according to Dr. Dyer's test, is a minimum quantity. Thus, so far as these two elements are concerned, one may say that the chemist has supplied a means of detecting whether any particular land is urgently in need of an artificial supply of them or not.

NITROGEN.

It will have been noticed that in the above all refereuce to nitrogen has been omitted.

It has been known for a long time now that, whilst the mineral foods remain in the soil in much the same state of chemical combination, suffering within moderate periods of time but little change, the nitrogen compounds of the soil are constantly undergoing very great changes. When first placed in the soil, either by accident. such as the remains of crops or leaves of trees, or by the agency of man in the form of farm manure, the nitrogen exists as a part of complex compounds, which are classed principally under two heads, the albuminoid and amide bodies.

It then becomes forthwith the food of a host of micro-organisms which resolve it gradually into simpler states of combination, such as a ammonia and nitrates. Another class of organism is unfortunately also present, which may proceed a step further than many of us consider desirable, for it liberates the nitrogen altogether, a state in which this element is useless to most plants.

Now these changes in the condition of the nitrogen of the soil are constantly going on, more vigorously at one time than at another, a moderate degree of warmth and a proper supply of moisture being among the most desirable conditions. Furthermore, since some of these nitrogenous compounds are soluble in water, they are apt to be carried away by drainage water, which is not the case with either phosphates or potash. Thus it is probable that no simple method will ever give us the answer corresponding to the one we have for valuing the supplies of the mineral foods.

At present, at any rate, we can only determine the total amount of nitrogen in a soil, and judge from it whether it will repay us to supply manure.

So far as Indian soils are concerned, I may say that, with few exceptions, they uniformly contain very low proportions of nitrogen, and at the experimental farms we have found that nitrogenous manures have given greatly increased crops. In a series of experiments at the Cawnpore farm for instance, farm yard manure has produced, weight for weight, a greater increase of wheat over a period of 15 years than it has done at either Rothamsted or Woburn in England.*

NITROGENOUS FOODS.

Chemists have, however, sought to answer another question about nitrogenous food for plants.

I have already indicated the states in which the nitrogen exists in the soil. There is in addition a very abundant supply of free nitrogen in the atmosphere. It has therefore been a problem to determine in which of these different states is the nitrogen most useful to plants.

As to the nitrogen of the atmosphere, I need not dwell at any length, more especially as I dealt fully with the subject in this room about 12 months ago. You are all probably aware, that it has been proved that elementary (*i.e.*, uncombined nitrogen) is assimilated by the plants of the papillionacæ and likewise by some of the algæ, but among our farm crops, those of other natural orders are dependent on a supply of combined nitrogen.

Many years ago, experiments were made by Cameron in England, and Hampe, Knop and Wagner in Germany, to test whether the higher plants were able to assimilate various forms of combined nitrogen, and the result of the experiments was that the cereals were found to assimilate such nitrogenous compounds as urea, hippuric acid, glyoocoll and guanidin, as well as nitrates and ammonia.

Later, however, it became evident that these experiments were open to doubt. It became known that nitrogenous substances may be readily changed by the various micro-organisms into simpler compounds. It followed as quite possible, nay probable, that in Cameron's experiments, the complex nitrogenous compounds which he had added as manure, were, during the progress of the experiment, transformed by such organisms into simpler substances.

In order to determine definitely whether such compounds were useful to higher plants, the experiment must be conducted in the entire absence of such micro-organisms.

The question has therefore been lately taken up again, and with the result that, apparently none of these complex nitrogenous compounds are directly useful to highor plants. Lyebyedyer found that barley could not feed on them in the absence of soil-organisms. And he practically proved this result by adding, in a second series of cultivations, a quantity of organisms from a soil, when his barley plants managed to make some headway. The growth was only moderate, for the plant had to wait until the micro-organisms had reduced the complex compounds to simpler forms. Finally he showed that nitrates, supplied in the absence of bacteria, were readily assimilated. Other workers have been Maze, Lietz and Pagnoul, whose experiments generally confirm those of Lyebyedyer. These experiments are quite recent and will probably be repeated, but it is highly probable that the higher plants can only assimilate nitrates and ammonia, and that the more complex nitrogenous compounds must first be converted by the myriads of minute organisms, which inhabit the surface soils, into simpler compounds, before they can be useful to our crops

Before passing on to the next chapter of this paper, I must not omit a very brief reference to the work on soils which Professor Hilgard, and those who are associated with him at the University of California, have undertaken. It consists of an exhaustive examination of the inherent differences which exist between the soils of the humid and the arid regions of America. Unfortunately these investigations cannot well be done justice to in any brief digest, and I must therefore refer my hearers to Dr. Hilgard's original papers. Nor shall I detain you with details of the investigations which Hilgard and Loughbridge in America, and I. here, have made on the salty land called *usar* in India, or "alkali lands" in America; excepting to say that, whilst working independently, we have arrived at corresponding conclusions. The result of those investigations has gone to show that comparatively small amounts of these salts are sufficient to prevent the proper growth of crops; that in some cases drainage may effect their removal, though in other cases the soils are in a less amenable state. Also that in some cases gypsum may be of service, in other cases useless.—*Indian Forester.*

(*To be Continued.*)

SUBSTITUTES FOR TEA.

At the present time, when the important question of how best to increase the consumption of tea with profit to producers and pleasure to consumers is engaging so much attention, it may be interesting to remind readers in this country that the cup that cheers does not everywhere contain the beverage with which we are all so familiar and which is prepared from the leaves of a plant that is known scientificially as *Theachinensis.* "Tea" is, in fact, an accepted term for a good many beverages that are no more tea than beer is, any infusion or decoction made from the leaves, flowers or twigs of edible plants and shrubs being conveniently described as tea. To begin with, it is doubtless commonly known that in many parts of Southern India, the Natives prepare a palatable and aromatic beverage from the long leaves of the lemon grass. The leaves

* (An exhaustive examination of these experiments is now in the Press.)

are gathered fresh and tender, infused in boiling water, and then served with sugar and milk added, although the poorer classes do without the addition of the last luxury. The preparation is known as *pachachaya* or green tea, and it is highly valued as a night drink for patients ailing with certain disorders, for the leaves possess carminative, antispasmodic and other medicinal properties The people of Arabia and Abyssinia make their tea from the twigs and leaves of the shrub known as *Catha edulis*. Slender shoots of the plant along with the attached leaves are gathered and made into bundles, and when required for use, a decoction is prepared which is said to be pleasant to the taste and very similar to ordinary green tea. The leaves are also chewed by the labouring classes in Arabia and Abyssinia when food is scarce or when work demanding physical endurance has to be accomplished, for they are believed to possess the property of sustaining human energy. Cafta, as the beverage is properly called, had to make a struggle to obtain popularity among the Arabs, for when it was first brought into use, the orthodox condemned it on the ground that it was excessively stimulating, and, therefore, *taboo* to Mahomedans. But a Council of learned and holy men assembled to discuss the matter and arrived at the conclusion that though a stimulant, the drug was not sufficiently intoxicating to be included in the category of drinks forbidden by the Koran. It is said to produce great hilarity of spirits and to remove drowsiness. The leaves of a species of *Hydrangea* are very largely used in Japan as tea, being prepared in the form of a decoction, and the beverage is so highly valued by the Japs that they call it, with true Oriental imagery of expression, *Ama-tsja*, or the Tea Heaven. In Tasmania and the Falkland Isles, species of myrtle are used for tea, the leaves being infused and furnishing a fragrant and fairly palatable drink, which has, however, to be made weak, as the leaves possess emetic properties. Other species of trees belonging to the myrtle order, such as the *Glaphyria nitida*, in Bencoolen, the *Leptospermum*, in some of the Australasian Colonies, and the *Eugenia* in Chili, are all largely used by the Natives for the same purpose. It is almost a matter of history that a certain species of myrtle often served for tea on board the vessels of Captain Cook's expeditions in the South Seas. In parts of Siam, a leaf known as *Laoten* is the substance which furnishes the people with their drink. The leaves are steamed, tied up into bundles and buried in the earth for several days, and after they have undergone a process of fermentation they are taken out and either drunk as tea or chewed. Like the cafta of the Arabs, this tea is supposed to impart powers of endurance to those who partake of it, The leaves are so prepared that they keep well for over a year.

A particular species of *Simlax*, the roots of which constitute the sarsaparilla of commerce, was at one time very extensively employed in Australia as the tea of the Natives, and thereby came to obtain the title of Botany Bay tea. In parts of Africa, a leguminous plant, akin to the English broom, furnishes the leaves known as Bush tea, the prepared drink possessing an agreeable smell and a pleasant taste, not very different from the tea that is served at our own tables. Another leguminous plant is used in Chili as a substitute for the more famous Mate or Paraguay tea. Mate itself is of considerable importance, being very largely used in Paraguay, Brazil and other parts of South America. It is also known as Jesuits' tea and St. Bartholomew's tea. It is plucked from an evergreen plant of the holly tribe, the leaves being roasted on the branches, stripped off when dry, and coarsely powdered. The powder, with sugar to taste, is thrown into a cup, which is then filled with boiling water. Sometimes, burnt sugar and lemon squash are added to heighten the flavour. The beverage is not drunk, but is slipped up through a glass tube. Three brews are commonly made use of, the first one being the most pleasan to the taste and but slightly stimulating, the other two being very much stronger, and yet harmless. Mate has been drunk by the Natives of South America almost from time immemorial, and it is called Jesuits tea merely because the Missionaries were the first to cultivate it systematically, and just in the same manner as quinine is known as Jesuits' bark. Afternoon mate is as fashionable in South America as five o'clock tea in English drawing rooms. The consumption of mate in the various South American Republics is from 30 to 40 millions of pounds annually. The Brazilian variety of this tea is known as Gongonha.

In North America, we find another species of holly largely used by the Indians for the manufacture of a kind of black tea, which is said to contain the active principle of China tea and to possess certain advantages over the latter. It is sometimes called Appalachian tea. The United States Government has lately interested itself in this shrub with a view to ascertaining whether it could not be brought under systematic cultivation. In the same region, the leaves of a species of *Viburnum* or honeysuckle are mixed with the above, the result being locally considered a fairly satisfactory blend. In Tropical and Central Africa, a species of *Eupatorium*, or daisy, makes an excellent tea, the dried leaves, which are used for the purpose, giving an aromatic smell and an agreeable taste. The use of this tea, which is now known in Mauritius, Ceylon and elsewhere, is said to be harmless. The leaves are also possessed of valuable medicinal properties. This tea, it may be mentioned, is commonly known as Ayapana. In parts of the East, *Ocymum* leaves furnish what is known as Tulsi tea, while the dried leaves of the wild marjoram are a popular substitute of China tea. Two other species of marjoram are employed in North America for the preparation known as Oswego tea, while an allied species of rosemary is another occasional substitute for tea. It may not be generally known that in Sumatra and some of the adjoining Islands, as well as in parts of India, the poorer classes, with whom necessity is the mother of invention, employ the roasted leaves of coffee for an infusion which goes under the name of coffee tea, but we would doubtless want our palates especially educated to discover anything satisfying in such a wonderful decoction. In North America, two species of heath are pretty largely used as substitutes for China tea, one variety going by the name of Salvador tea and the other of Labrador tea. Turning to Europe, we are at once reminded of the extensive use to which a species of Mullein or Figwort has been used for centuries by the Germans in the preparation of tea, the flowers and not the leaves being used, and care being taken to detach the hairy filaments which cover the flowers and which would cause a most irritating sensation if taken into the mouth, Mullein has been so largely employed that it has obtained the name of *The de l' Europe*. Finally, it may be mentioned that the familiar English cowslip was once largely used in England by the lower orders for the manufacture of a tea by the name of Paigle. It would not be difficult to mention the names of several other plants, shrubs and herbs, whose leaves, flowers or roots have at some time or other administered to the service of man as substitutes for tea, but enough has been said to show that our familiar friend, China tea, is not the only beverage that the world has drunk out of "the cup that cheers but not inebriates." YOR.
Madras Mail, 11th Oct.

Manure for Tobacco—Where wattle ashes can be procured, they are said to form an excellent manure for tobacco. Mr. J. M. Van Leenhoff, tobacco expert in Natal, states that they may be used for procuring a mild, good burning tobacco. The ashes should be ploughed in very shallow, four or five months before planting.—*Queensland Agricultural Journal.*

THE AMERICAN "BOY TRAVELLER" ROUND THE WORLD.

IN THE PHILIPPINES:

WHAT HE THINKS OF MANILA AND ITS TRADE, NEW AND OLD PRODUCTS, PROSPECTS, &c.

AMERICAN JUSTICE AND THE "FILIPINOS."

Manila, P. I., Sept. 28.

I am leaving on Monday for Hongkong, and this morning the spirit moves me to write and tell you something of my experiences since leaving Ceylon. It seems an age since I visited your sunny isle, not but what I have a lively recollection of your kindness and my good times, but because so much has transpired since. As you know, we proceeded from Colombo to

SINGAPORE,

where, much to my disgust, we remained five days. I didn't find the city nearly so interesting as your capital, and one day sufficed to exhaust all the "sights" there were to see. I visited the Botanical Gardens the first night, to attend a band concert, but that was the only experience in Singapore which I will remember with real pleasure. The Chinese were everywhere, and I think we have too many of them in New York to be interested in seeing them out here. I thought at first that their shops and residence streets were worth seeing, but they were all alike, and the smells were nauseating. I think you should be glad that you haven't the Chinese plague in Colombo: the Sinhalese are ever so much nicer to have around. All the English in Singapore say they couldn't possibly get along with only the Malays to do the work, and that is doubtless true, so they are wise in makind the Chinaman welcome.

I have been in

MANILA

now for three weeks, and in some ways I am greatly pleased with our new possessions. The city of Manila, under proper laws, should become one of the greatest ports in the East, if not the very greatest, next to Hongkong, because the Islands are evidently rich in agricultural, mineral and timber resources; and there must eventually be built up a great exporting business. The Government has experts who are investigating these resources, and their reports have so far been very encouraging. In lumber alone there is untold wealth, and there are millions of acres of uncultivated fertile lands. The tobacco and orange plantations are by no means as numerous as they should be, and, of course, there are unlimited possibilities in the cultivation of hemp and coconuts. This must surely be one of the richest archipelagoes in the world, and I trust we Americans can make it pay.

Conditions, as you have read, have been rather discouraging until the last few months. The insurrectos kept up their guerilla warfare in several of the provinces, and the whole country was unsettled and anxiously awaiting what was to come next. But since Civil Government was established, on July 4th, everything has quieted down. There is fighting in only two or three of the most remote districts, and the vast majority of the Filipinos seem to have become good Americans. In Manila business of every kind is on the increase, and everyone takes it for granted that the war in the Philippines is over. But the Civil Commission has still a great deal of hard work ahead of it. They have to proceed with exceeding care, for fear of making a mistake now which will have to be paid for with interest later on. Governor Taft is a strong man, and he is making a deep study of conditions, so I have faith that everything will come out all right. Business development will be slow until our Congress meets in December and decides the status of the islands. Then American banks can be established, and large corporations will not hesitate to invest their capital. It appears certain that some great fortunes will be started out here within a very few years, and I hope that there will soon be several lines of American steamers running around the islands. The line which at present does all the business is owned in England, and unfortunately the managers are not disposed to treat Americans with much consideration. The same is true of the two English banks here, so that I am afraid your countrymen are not laying a good foundation for future success here.

The streets and public buildings of Manila are being rapidly improved, but there is plenty to be done before the city can compare with Colombo, Hongkong and other English Colonial cities in the East. The Spaniards found the Philippines a source of revenue, but the revenue was certainly not spent here, from the looks of things. It is expected that an electric railway will soon be started by an American Company, and various manufacturing concerns are contemplated. The Government has erected the largest artificial ice plant in the world, so our soldiers have plenty of coolness during these hot days.

There is a large element

"AT HOME"

which is anxious to get rid of these colonies in any possible way, but I'm sure that if they saw these people and how glad they are to have American justice, they would be willing to accept this great responsibility which fate has thrown upon us. It is possible that we won't be quite so successful at first as England is now in governing her colonies, but I feel confident that we will in time do just as well. I hope we won't be looked upon as you English look upon France and her colonies,—something to be laughed at. What man has done, man can do, and after all, we're of the same blood, and should share the same capabilities for colonisation. I only hope that the extreme Republicans at home won't insist on giving the Filipinos full citizenship. They may deserve it after a while, but at present they need a lot of educating. Several hundred school teachers have recently arrived from the States and are being scattered through-

out the provinces, so in a few years we may expect to hear English where we now hear Spanish.

I must close this rambling narrative. I am looking forward with pleasure to seeing China and Japan and then to getting home, for I am rather tired of travelling. My articles on Ceylon will soon begin to appear and I will try to send you copies of some of them, so you will know I wasn't exaggerating my appreciation.

HARRY STEELE MORRISON.

THE TEA TRADE: AMERICAN NOTES.

A British Consular report from Kiukiang states that in brick tea the export shows an advance from 51,610 to 60,794 hundred-weights, but this is partly accounted for by the fact that whereas the figures for 1,900 include a portion of the 1899 crop, none of the 1900 crop was left over to be dealt with in 1901. The same remark applies to tablet tea, of which the output has, however, slightly fallen off. Expensive hydraulic

ENGINES FOR MAKING TABLET TEA

are now in use in the factories, and the old wooden presses for making the bricks are being, or have been, replaced by steel moulds of an improved pattern. At the beginning of last season the price of the dust used for brick tea ruled at about 11 to 12 *taels* for picul, and against 7 to 8 *taels* in 1899. The Chinese dealers combined to demand 13 *taels*, but the outbreak of the northern troubles compelled them to accept a reduction, and before the season closed they were selling at about 6 *taels*. For tablet tea a better quality of tea, at considerably higher price, is required.

For the manufacture of brick tea the dust is moistened by steam. It is then subjected to a pressure, applied by steam power, of twelve tons to the whole surface of each brick. The pressure is only applied for a second or two, but the mould is immediately locked with wedges and kept so for about two hours. The bricks are about 8½x6 x1 inch in size, and vary in weight from one to two and one-half pounds for different grades.

The tablets are made by means of a hydraulic press. The dust is used dry, and a very high pressure is required, as it is only applied for a fraction of a second. When made they somewhat resemble cakes of chocolate, weighing about four ounces each. They are then tastefully wrapped in paper covers, and packed in baskets suitable for camel transport.

The British Army requires 1,000,000 pounds of tea annually. Brig.-Gen. John P. Hawkins (retired), late Commissary-General United States Army, stated that, during the Civil War, the troops in his division travelled farther, and sustained the fatigues of the

MARCH BETTER, WHEN TEA WAS SERVED

instead of other beverages.

W. K. King & Co., Detroit, Mich.:

"Tea-drinkers are rapidly dying-off. America is destined to become a great coffee-drinking nation."

Mau, Sadler & Co., San Francisco.:

"We decidedly think the

DEPRESSION IN TEAS IS DUE TO THE PRESENT DUTY.

The imposition of the duty has been a detriment, decreasing the consumption among the poorer and medium classes. The duty has caused the importation of very much lower grades. Less fine tea is used at present than formerly. The removal of the duty would be a benefit to the consumer, and better grades would be imported."

C. W. Antrim & Sons, Richmond, Va.:

"We consider the depression in the tea trade due to two causes:

"First.—On account of the Government allowing low-class, trashy teas to be brought into this country before the duty was put on,

"Second.—When the duty was put on, it made the medium class of teas, that are great sellers, too high.

"Now, we think if the duty is taken off and low-class teas are prohibited, you willksee quite a difference in the tea trade."

The above opinion are among many of similar import, given in reply to inquiries made by the New York *Commercial*. The facts are that the per capita consumption in 1901 is practically the same as in 1900, not varying over one-hundredth of a pound. The use of tea, judged by the per capita record, has been lower since the imposition of the duty of 10 cents per pound.

AMERICANS ARE NOT LOVERS OF TEA AS A BEVERAGE,

and so because the average quality of imports has always been low—very low. Very fine tea forms a small part of the total imports. If consumers were educated to an appreciation of fine flavor, and would acquire the habit of using the beverage as a means of gratifying the palate the tea trade would be in a more satisfactory condition. But how can we expect the inexperienced housekeeper to appreciate niceties of flavor, and pay for the same, when tea experts differ as much as 20 cents per pound in their estimate of value on a sample of fancy Formosa Oolong?—*American Grocer*, Sept. 11,

THE COST OF PRODUCTION OF COFFEE IN BRAZIL.

A propos of the figures published in a late number of the Review on the cost of production at the Fazenda Uniao, a correspondent from Pernambuco writes under the designation of "Gold versus Exchange" as follows:—

	1896	1897	1898	1899	1900
Arrobas per 1,000 trees.	1 70	87	121	57	217
Average exchange	91 -32	711 16	7 5·32	7 27·64	9 27-64
Price per 15 kilos	·8d	8s.	6s.	5s. 4d	6s.

A *reductio ad absurdum* to begin with! The table can be read to show that a low exchange causes the trees to bear less whilst a higher exchange causes them to bring forth more abundantly! This deduction is no more wide of the mark than is the assertion that exchange can affect the gold price—as great a fallacy as that it is the 'tail that wags the dogs.'

The sterling price—assuming that this is based solely on supply and demand and that Stocks and Visible Supply, are the prism through which the relative effect is foreseen, then we can arrive at an evident reason why Coffee was worth 11s. 8d. in 1896 and 8s. in 1897. In 1896 the reading of the prism was too optimistic, and so this year we got more for our Coffee than the acutual circumstances warranted. In 1897 the reading of the prism was still too optimistic at 8s, for next year still shows a decline, notwithstanding a smaller crop. In 1898 the prism is still too optimistic, for next year shows a drop from 6s, to

5s. 4d. In 1899 the prism too low, for next year shows a rise from 5s. 4d, to 6s. and so we can go on *ad infinitum.*

The above seems to disclose of two fallacies, viz—that exchaoge can be a factor in the fixing of the gold price—it at most, oan only be a fact r for accepting or rejecting the fixed gold price during, say, a month or two; the other fallacy is that of Dr Assis Brazil, and of many others, viz, that Importers and Retail dealers can combine to sell at fantastic rates. The import price, as we have seen, depends on the sanguine or doleful view of the probable effect of supply or demand, and the Coffee market is not yet nor is it likely to be collared by any one Trust, so supply and demand hold the field. As for the fantastic difference between the price of Coffee here and its retail price, this is naturally accounted for by the actual cost of retail distribution. A corollary can easily be deduced from all this, viz. that speculation can have much less to do with the price of Coffee than is often supposed to be the case.—*Brazilian Review* Sept. 3.

THE BOTANIC GARDENS AND GUTTAPERCHA.

The expedition to the hilly districts of the S W of Ceylon for determining the yield of guttapercha from indigenous species of Sapotaceae is meeting with undoubted success. The party consists of Mr Herbert Wright, the Scientific Assistant and Acting Curator of the Royal Botanic Gardens, Peradeniya, together with forest guide, plant collectors, interpreter, appu, and twenty coolies who are well loaded with boxes containing the necessary herbarium, paper, collecting utensils, preservatives, and general scientific instruments. Mr Herbert Wright, writing to a Colombo friend, states:—"Hinidoonkanda is just the place I anticipated. The soil is very poor, there is plenty of water, and an altitude of 2,200 ft. Under such conditions you will not be surprised to learn that I found over 70 trees of the particular species required, and some of which attain considerable dimensions. There is plenty of guttapercha in these trees and I could go on collecting for three months quite comfortably. Should the samples prove of high commercial value, it will be an easy matter to collect many thousands of seeds and seedlings of this species from Hinidoon alone, to say nothing of Kittulgalla, Eratua, Singhe Raja, and Hewesse where I know this species to abound. The vegetation here is a perfect treat consisting of huge woody climbers, epiphytic ferns, abundance of pitcher plants, and that pretty leaved orchid—the finest in Ceylon—Anactochilus regalis, or Wana-raja of the Sinhalese. I had a fine stroke of good fortune with Diospyros oppositigolia, a species of ebony limited to, and almost extinct in, Ceylon. I did not find it until the 11th day and had well-nigh lost all hope of ever seeing it. Dr Trimen never saw it and Dr Thwaites described it as very rare. I managed to get male and female flowers, fruit and timber. You will remember that hitherto the female flower and fruit were unknown. I shall have to disagree with the opinion of Dr Thwaites about the value of the timber of this species which he asserted was equal to that of the Calamander. It is a plain white wood, and the trunk frequently quite hollow. It grows alongside trees of Calamander and the appearance of the bark and the arborescent habit is the same for both species. Hence the source of error is obvious.

"We have some very pleasant evenings when the weather is fine, and to see the glare of a roaring fire and hear the crackling of the branches reminds one of other days along the west coast of Scotland; altogether it is a rough happy life and well worth time and money to experience."

THE SEYCHEILES,

The revenue of Seychelles last year was the largest ever collected, and amounted to R399,311, while the expenditure was R351,919. The revenue has gone on steadily increasing of recent years, and in the laslt 36 years it has increased more than seven-fod, while the expenditure has in most years been less than the revenue, and has invariably been so since 1896. Customs duties form more than half the total revenue. The value of the imports last year was, R908,911 and the exports R1,036,161. The chief exports are vaanilla and coconut oil; small quantites of guano and tortoise-shell are also sent abroad, while rice, coal, cotton goods and sugar are the chief imports. The United Kingdom sends over a third of these, India nearly a third, Mauritius about a sixth, and France the remainder In the preparation of vanilla, coffee, cocoa, and tobacco, the extraction of coconut oil, the manufacture of aloe fibre and lime-juice, the making of preserves and pickles, the extension of the fruit industry, and the development of the fisheries the colony offers full scope for the energies of its people. Seventy-four islands are included in the administration of a total area of 248 square miles; the chief is Mahé with an area of 55½ square miles, and nearly the whole of the land in all the islands is in private hands. The population was estimated at 20,275 at the close of the year, and has almost trebled in the last 50 years. The administrator of the colony, from whose report for the past year these facts and figures are taken, says that, in spite of the excellent climate, the islands are not adapted for white labourers, though Europeans do well as managers of estates and owners of property. Residents can lead an outdoor life without fearing the usual effects of exposure in tropical countries. "For a man of energy, perseverance, and temperate habits Seychelles affords as good an opening as any other tropical colony. But he must be provided with sufficient capital to enable him to buy land outright and to wait until the crops give a return. He must live on his estate, and make himself acquainted with the peculiarities of each vanilla vine as well as those of his labourers. He must be ready to learn and to make use of his knowledge when acquired. He should not rely, as many planters do, on the somewhat capricious return which a vanilla plantation gives, but endeavour to plant up his estate with other tropical products for which the climate and soil of Seychelles are well-suited. He should, in fact, be guided by the same principles

which actuate the skilled agriculturist in England and other countries, and remember that the chief elements of success are patience and hard work."—London *Times*, Oct. 2.

PRODUCE AND PLANTING.

The following letter signed "Taster," in the *Grocer* of last Saturday, shows that although some grocers are apathetic on the subject of the private tea auctions, others in the trade are doing their best to rouse up the sleepers. It says: "In view of the committee meeting of the Grocers' Federation in Glasgow next week, it may perhaps prove of interest for these gentlemen to learn that, so far from the secret tea sales 'fizzling out' as many grocers appear to believe, they are very much alive. Messrs. P R Buchanan & Co. continue well to the fore; and dealers and blenders are merrily competing every Wednesday for the privilege of squeezing the grocer. The ranks of the 'ring' have this week been swelled by the accession of Messrs. Shaw, Wallace & Co., who include tea from the Budla Beta Company in next week's private auction. This in itself is not a matter of much importance, so long as the great majority of leading merchants remain solid for the policy of the open door, but we have had some experience of the cheerful methods adopted by the Tea Buyers' Association in the matter of Ceylon sales, and if the supply of secret off rings can only be made sufficiently large, there is little doubt that the private room would again be used as an engine of coercion against sellers in the public sales. The new ewe lamb will doubtless be welcomed into the secret fold next week with suitable adulation and plausible promises; a high price will probably be paid for him by his admirers, and he will be afterwards distributed to the confiding grocers. Whether the sellers obtain a better or a worse price at these sales is not a question into which I propose to enter. The seller has a perfect right to dispose of his property as he thinks fit, and in this case there may be advantages which are not apparent to other people. It is sufficient for the grocer to know that supplies are now forthcoming for secret auction from a fresh source. It might perhaps be well, however, for the retailer to clearly understand that the opposition on the part of merchants to the secret sale scheme does not arise from any special desire to protect the grocers interests or to fight the grocers' battles; it simply arises from the fact that the great majority of merchants have the common sense to perceive that it would be as detrimental to their interests to be shut into a private room as it would be detrimental to the grocers to be shut out. The extraordinary apathy displayed by the grocers throughout the country in not grasping the fact that their interests are in this case identical with the merchants is certainly somewhat remarkable. I would venture to point out, that if the grocers do not see their way to speedily make common cause with the merchants who are combating the 'ring,' the 'fizzling out' process may develop in a way which grocers least expect."

Apropos the reference made in a recent issue to the Inland Revenue statistics about drink, a return prepared by the authorities of the Board of Trade giving information as to the consumption of alcoholic beverages in various countries contains plenty of material for thinking, and proves that there is plenty of scope for the consumption of tea, coffee and cocoa. Of the total revenue of the United Kingdom 36 per cent comes from the taxation of alcohol. The United States derive 29 per cent of their income, France 19 per cent, and Germany 18 per cent from this source. Of wine the United Kingdom consumes 0.39 gallon per head, Germany 1.45, the United States 0.33, and France 2.5 gallons per head. France is the largest wine-consuming country. The figures for our own country shows a consumption of 31 gallons of beer per head, whilst France has 6 gallons, Germany 27, and the United States 13. In spirit drinking, as in wine drinking, France takes the lead. A comparison between Great Britain and her colonies is instructive. In New Zealand the consumption of wine amounts 0·15 gallon per head, that of beer to 8 6 gallons, and that of spirits to 0·69 gallons. Even more remarkable are the figures for Canada, where the consumption of wine is 0·08 gallon per head, of beer 4·0 gallons, and of spirits 0·68 gallon per head. It is clear that some of our colonies can give us lessons in temperance.

In this connection it is worthy of note that the writer of some special articles on the spread of temperance in the *Echo* says:—"Tea is the salvation of Australia. In Russia the whole of the vast nation would grovel under the rule of the vodke demon but for the counteracting effect of the samovar, which brews the most delicious preparations of tea to be obtained in the world; so Australia would in a few generations become a country of frivolous and volatile wine-bibbers were it not for the allurements of the teapot. Throughout the Australasian Colonies tea is taken at every meal by all classes. It is safe to say that our 'corn-stalk' cousins do not on the same average spend more than half as much on intoxicants as we do. The temperance movement is a much more powerful social factor there than here."

As will be seen on reference to the summary of the new Fiscal Bill of the Australian Federal Parliament, given in another column, the duty on tea per pound is 2d, plus twenty per cent ad valorem' and on cocoa per pound, 2d, plus fifteen per cent ad valorem.—*H. and C. Mail*, Oct. 11.

KEW GARDENS.

MR JOHN PURCELL QUINTON, a member of the Gardening Staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Curator of the Botanic Station, Sierra Leone. Mr Aage Engelbreth Casse, Director of the Plantations and Experimental Gardens in Hayti. Messrs James G Duncan and George Douglas, assistants in St. Geore's Park, Port Elizabeth. —"Kew Bulletin," April-June, 1901.

RETIREMENT OF CURATOR.—It will be a matter of genuine regret to all acquainted with Kew that Mr George Nicholson, F.L.S., was compelled by impaired health to retire on June 31st from the post of Curator of the Royal Botanic Gardens. Mr Nicholson entered the Curator's office on February 15th, 1873, after a public competition. In 1886 on the retirement of the preceding curator, the late Mr John Smith, Mr Nicholson was appointed by the Treasury to succeed him. Mr Nicholson's services to Kew are well-known. To him in a great measure is due the present efficient condition of the Arboretum. The *Hand list of Trees and Shrubs grown in Arboretum* was prepared by him, and is universally accepted as a standard authority for their nomenclature. Kew still hopes to retain the benefit of Mr Nicholson's botanical experience now that he has been relieved from the pressure of administrative duties.

NEW CURATOR.—The First Commissioner has filled the vacancy created by Mr Nicholson's retirement by the appointment of the assistant curator, Mr William Watson. This officer entered the service of Kew in 1879 as foreman. In 1886 he was raised to the position of assistant curator, in charge of the indoor cultivation; this, as curator, he will still retain. Mr W J Bean, the Assistant Curator in charge of the Arbo-

return, will now take the general charge of the grounds of the ligneous collections.—Kew Bulletin," July-September.

MOSQUITO BRIGADES FOR INDIA.

(*To the Editor of the "Pioneer."*)

Sir,—The great interest taken in the subject of malaria and mosquitoes by medical men and other persons in India suggests the hope that the time has now arrived when some general measures can be commenced to limit the propagation of mosquitoes in Indian cantonments, towns and plantations. The operations now being conducted in West Africa by the Liverpool School of Tropical Medicine, cordially assisted by the Governments of the various colonies on the coast, and by the Americans in Havana, demonstrate not only the advantage of such measures but the best means of executing them. In order materially to diminish the number of mosquitoes in any town or cantonment it is necessary only to organise a Mosquito Brigade in the following manner:—The local Health Officers, or District Medical Officer, or other person interested in the subject, should at once engage the services of an intelligent head man and a sufficient staff of workmen, who will constitute the brigade. These should first be instructed how to find the larvae of mosquitoes in vessels of water in the vicinity of houses, in pools of stagnant water on the ground, in garden cisterns, drains, and so on. Native agents, carefully selected, will be found quite capable of learning the work. The brigade should now be at once employed in getting rid of all the collections of stagnant water in which mosquitoes breed within the area of operations. Empty tins and bottles, broken flower-pots and unconsidered vessels of the kind, in most of which mosquitoes multiply during the rains, should be carefully collected from the compounds and back yards of houses and dumped in an assigned spot. Tubs or vessels of water which cannot be dispensed with by occupants of houses should be periodically emptied or treated with kerosine oil. Once a week will suffice. Cisterns and wells which are in use and are found to contain larvæ should be treated with oil; others should, if possible, be closed or filled up. Shallow rainwater pools and slushy areas in which larvæ occur can generally be easily obliterated by means of a "scratch drain" and a few basket-loads of gravel; deeper pools, but rubbish collected from houses and covered with earth. If pools occur in the course of drains or gutters, the attention of the local municipality should be called to the fact. The oil can and especially the broom are most useful until more permanent work can be done. Small driving streams, which are often prolific sources of mosquitoes at the end of the rains, can be periodically cleared by a gang of coolies with brooms, especially after the last showers of the season; but for more permanent effects, hollows in rocks should be filled with concrete and rubble. The guiding principle is contained in three words: no stagnant water.

Experience in Africa shows that these operations are not nearly so formidable as may at first sight appear. It is astonishing how much can be done even by a few men, when they are steadily employed. Thus it has been found in Sierra Leone that six men can clear fifty houses and remove ten cart-loads of broken bottles and empty tins daily. As to ways and means, beyond the salaries of the men the cost is little, a few spades, brooms, pickaxes, and kegs of crude petroleum sufficing—at least under ordinary circumstances. The local Municipality and Public Works Department will generally give much assistance in the way of carts, implements and even labour. In my opinion, however, it is best not to wait for or depend solely upon Government aid, but at once to raise a local public subscription for the costs of the local brigade. In Africa the response has been so immediate and so generous that there is no doubt a health officer will be able to raise similar funds almost everywhere where Europeans reside. Even R50 a month will suffice to maintain a gang of five or six men, who will do much for any ordinary Indian cantonment. It is emphatically my opinion that the campaign against mosquitoes in towns can best be commenced by private enterprise. At Lagos, for instance, the merchants subscribed £150 a year at my first request; for Cape Coast Castle, a single gentleman has given £400 a year; while the Sierra Leone £2,000 was put down immediately by another philanthropist.

A warning must be recorded against commencing operations over too large an area. It is best to begin in the immediate vicinity of the houses of Europeans and other subscribers. Experience shows that in the large majority of cases, where mosquitoes abound in a house, they are being bred close at hand. But in this matter, as well as in the questions of the number of men to be employed, the superintendent of the operations must be guided by local conditions, and, needless to say, nearly all medical men are now well enough acquainted with the subject to form their own plans. A beginning once made, the work will shape itself as it proceeds; and it will generally be found that as soon as neighbouring breeding places are carefully removed, the winged insects will vanish as if by magic. In order to prevent theft or imposition it is advisable to give a distinctive badge to every man employed. No special legislation is required; and experience proves that the occupants of even the poorest houses willingly second the efforts made to rid them of these troublesome and dangerous pests. In military cantonments the officer commanding can generally be induced to give the assistance of fatigue parties of men. Planters who suffer so frequently from malaria both in purse and person should at once request their medical officers to commence the operations required. Seeing that mosquitoes are responsible for malaria, yellow-fever, and elephantiasis, and are a great source of annoyance to all, there can be little doubt that before many years have passed pretty general efforts will be made to get rid of them in the principal centres of civilisation in the tropics. It seems to me that the sooner these efforts are commenced the better.

In conclusion I should like to add that if any medical man who is desirous of employing a mosquito brigade in the town where he is stationed, but who finds after proper efforts that he cannot raise the necessary money, will represent the facts of the case to me. I shall probably be able to supply him with certain funds out of those placed at my disposal for this purpose by the Liverpool School of Tropical Medicine and by several private persons.

Ronald Ross, F.R.C.S., D.P.H., F.R.S., Major, I.M.S., Retired.

University College, Liverpool, 28th Sept.—*Pioneer* October 23.

PLANTING IN JAVA.

WEEDY TEA NOT SUBJECT TO BLIGHTS?

(*From a Practical Planter.*)

Oct. 10.

I have often intended sending you a few Java planting notes, as it has sometimes struck me as so peculiar that Ceylon and Indian men seem to know so little of this island or what she is doing, and the notices that have appeared in the *T. A.* in reference to cinchona &c. have not struck me as very "inspired" or generally near the mark. Tea, —it is apparently not yet *generally* realized in your part of the world,—exists in Java, except in an amateur way. I only hope it won't go on increasing as it has done last five years and that Ceylon planters won't

wake up one day to the fact that Java has given them the "go by" in that product, as she has formerly done in cinchona and in a lesser degree, in coffee. These Dutch planters travel slow, but sure! I am sure it is to none of our advantages to see *more* tea—*anywhere*. [But what about local consumption?—Ed. *T.A.*] I wonder, too, if that

ULTRA-CLEANLINESS FROM WEEDS

that every Ceylon planter I have ever met seems to think a "*sine qua non*" of good tea cultivation, has anything to do with the increase in both quality and quantity of diseases which tea in Ceylon seems more subject to than here?

After nearly 10 years planting in Java I am prepared to bet my bottom dollar that *young* tea, just as is the case with young cinchona, grows stronger and heartier, if amongst weeds. Sometimes old tea seems to do so too—of the right sort of course—not bad grasses, which should be regularly forked out in my opinion, and the fertilising weeds sometimes left though not to a *too* luxuriant amount and then dug in. Young tea on my estate and on others I have to do with, seems to me to revel in such conditions—and surely it is only following "Nature" that it should do so—for the young stems and crowns of the roots are all the time protected from excesses of sun, wind, wash and all forms of exposure and in the warm season kept cool and regularly re-dewed.

I saw really bad

"GREY BLIGHT"

for the first time in my life in Java last week and that was on the young tea estate of a Ceylon co-Director of mine, now resident in Java, on whose estate there is not a single weed of any sort to be seen. It is a perfect example of a clean tea estate and the weeding cost per bouw is very cheap, but on more or less 100 bouws the bushes were bare, from the joint attack of Helopeltis and this awful Grey Blight, and at that rate the weeding cost cannot be very cheap per lb. even if it is per bouw! Can it not be possible the young tea would have been hardier and better able to withstand these attacks, if let to run a bit wild at first On this estate I am sure such is the case.

But this is all treason to write to a Ceylon man, I know! So I will refrain.

LECTURE ON TEA BLIGHTS.

By J. B. Carruthers, Esq., F.L.S.

Coming to Ambegamuwa to talk about the diseases of tea is somewhat like taking coals to Newcastle as your Chairman has observed so carefully and knows so well the nature and effects of your common blights. Still you are already interested in them by means of Mr Collett, you may be more willing to hear what I have to say.

We may for practical purposes group the diseases which tea and other cultivated plants are subject to as environmental and specific. Environmental are those diseases which are due to physical conditions injurious to the vigorous growth of the plant such as drought, excess of water at the roots, continuous and powerful wind, absence of nutritive substances in the soil &c. These are evils which the planter knows well and he knows the way to cure the plant suffering from a disease of this order—remove the conditions if possible and the plant recovers if it is not too late. While mentioning this I may say that it would be an advantage if planters would make themselves acquainted with the usual symptoms in the leaf of some of these environmental diseases. If he can do it in no other way let him select a bush of no great value, somewhere that he can conveniently examine each day, and damage the roots by severely cutting them, so as to imitate to some extent the physiological effects of drought. He will then have an object lesson of a tea bush suffering from an environmental disease—a disease which he is able himself to deal with quite as well as if not better than a plant pathologist. I have frequently sent to me specimens of tea leaves and the leaves of other cultivated plants, which are merely discoloured and partially dead from the effects of drought or "wet feet." It is not always easy to say without a microscopical examination if this is so; but in many cases an acquaintnance with the effects caused by drought, wind etc., would lead to the planter being himself able to remedy the evil.

In the other class—the specific diseases are more common perhaps and more difficult to remedy or cure. They are diseases due to the attacks of a foreign organism on the plant an insect, fungus or bacterium. It is the duty of all to endeavour by observation and experiment to get all the knowledge possible of these enemies, so that we may be able to war intelligently against them and reduce the loss to the tea bush. It is important to remember that though the fungus or bacterium is called the "cause" of the disease yet it is only one of the causes, strictly speaking. Such disease are the effect of a number of factors working together. In the case of leaf diseases on tea we can see what conditions in addition to the presence of the spores of fungi are needful. We have in tea in Ceylon some specific leaf diseases, of which grey blight (*Pestaiozzia guepini*) is the most widely distributed and best known; and as it is known so well a great many leaves which are dying owing to environmental diseases, and other specific diseases not gray blight, are attributed to it. Grey blight is due to the presence of the growing mycelium of *Pestalozzia* in the leaf tissues, but the attack of blight in any spot on the leaf cannot take place unless when the spore lights on the under surface of the leaf when there is moisture in the atmosphere to allow it to germinate. Here in Ambagamuwa you have exceptionally favourable conditions for the germination of spores of fungi. Your days in which there is a moist atmosphere sufficient for spores to germinate are in a tremendous proportion to your anti-fungus growing days, *i. e.*, with dry atmosphere. The spore of the grey blight lights on the under surface of the leaf—as in the diagram—and in a moist air—a very damp atmosphere is not needed. I have grown the spores of grey blight on dry glass plates in the evening and early morning of an average day at Peradeniya when the air was not, either by the wet and dry bulb thermometor or to one's own senses, damper than usual. The spore grows along the surface of the leaf until it reaches a breathing hole or stoma in the leaf, of which there are large quantities on the under surface of the tea or other leaves. When it reaches one of these holes it turns in and grows in the space between the cells of the leaf. After it has grown for some time in these spaces it penetrates the cells and kills them successively. The time taken to kill any definite area of tissue in a leaf varies with the condition of the leaf, the moisture of the air, and other factors. In some experiments of tea leaves I found that a discoloured patch about the size of a ten-cent piece was produced some time after the spore had been sown on the leaf. In one case a visible patch of this size was caused in 12 days, in another 19, and in a third in 21 days. It is important to keep in mind that the time of the visible signs of disease is not the same as the time of the outbreak of the disease or rather the origin Planters frequently say of tea diseases as well as others "a sudden outbreak—I know exactly when it occurred"

but it must be remembered that the time responsible for the evil may have been 12, 19, 24, or even more days previously. The mycelium of the fungus is present in the leaf long before the discolouration is perceptible. In fact, there is no doubt in some of the flush picked and taken to the factory some mycelium of the fungus so that, if these leaves had been left, in a few days the disease would have been noticeable.

The methods of cultivation of tea are most fortunately the most excellent means of combating leaf diseases. The grey blight in nearly all cases is confined to the leaf tissues, not spreading to the leaf stalk, but I have in a few cases found this not to be the case, and I have received specimens from three different districts in which the fungus has spread to and partially killed the leaf stalk and the young wood of the bush. This should be looked out for by all planters carefully, and directly it is observed the bush should be pruned back below the discoloured leaf stalks and young branches. If the grey blight began to invade the permanent portions of the tea bush it would prove a much more serious enemy than it is at present.

After the grey blight mycelium has grown for some time and produced a fairly large discoloured patch, spores are produced and these becoming detached float about in the air and are carried by the wind to other tea and the same process goes on again.

A most interesting instance of the nature of the wind distribution of spores is to be seen quite near to this place. There is a belt of jungle along the crest of a hill about 30 yards wide and a road cut through the trees. The tea on the far side of the jungle was blighted fairly badly but the tea on the near side—the leeward—was only blighted just at the place where the wind blew through the gap in the jungle—a clear case of wind borne spores and a most instructive one.

With regard to the measures to be taken to reduce or avoid the evils caused by Grey Blight, our knowledge of the life history of this (though this is not yet complete) shows us the direction in which success is most likely to be gained. The destruction of as many diseased leaves as possible remove an immense quantity of spores. Burning is the only effective means of destruction. Unfortunately men who had taken trouble and spent money in removing their blighted tea leaves were discouraged when the effects were not so markedly beneficial as they hoped. This would always be so while only one man here and there went in for preventive measures. Universal co-operation in such sanitary means was essential to a complete success.

The study of the factors which are needed for an outbreak of grey blight is of importance and it is a matter for surprise that after an abnormal prevalence of this disease in 1898, followed by two years of rather exceptionably favourable weather for the spread of fungi, the quantity of grey blight is less than before. What factor is missing is not known. It is probable that the distribution of spores by the wind has been in some way favourable—perhaps a larger quantity has been carried away from the areas of tea cultivation than at other times.

The other diseases of the leaf in tea common in Ceylon are *Colletotrichum camelliæ* and *Cladosporium herbarum*. The former was observed in 1897, and sent home to a mycologist, Mr Massee, at Kew and named. I had not seen it on any tea in Ceylon until some months ago I got it from the same estate as it was got from before, so that in the four years intervening it has not spread, and therefore need not be considered as a serious danger. *Cladosporium* is also comparatively rare.

Turning to root diseases, for I am thankful to say we have no stem diseases, there is a disease which must be watched for and guarded against as carefully as possible. It is known to science as *Rossellinia radiciperda*, and is characterised by a white thread like mycelium which can easily be seen with the naked eye. The majority of fungi are either saprophytic *i.e.* living on dead and decaying substances, or parasitic, *i.e.*, preying on living animals or plants, but in this case of *Rossellinia* the fungus starts as a saprophyte on any dead timber, roots especially, and spreads to the living roots of tea and other plants. The white threads of mycelium can stretch out 7-10 inches from the dead root on which they are growing until they reach the young and tender rootlets of the growing tea bush. Those roots of jungle trees like *Simplocos* which are soft and spongy in tissue afford the best home for the fungus and enable it to spread more luxuriantly. In connection with this I have been working for some little time lately upon a disease of *Grevilleas* which may be due to the savager of this same root disease I have not yet discovered whether the root disease. (*Rossellinia*) is the cause of the death of the Grevilleas, or whether it comes on the dead roots of that tree after the tree is killed. I am experimenting by infecing the roots of a Grevillea tree with the fungus to see if it is capable of killing the tree. However it is important for every planter to recognise that the Grevillea roots may be the harbourers of this dangerous disease, and when they have a tree dying or dead to use preventive means. The best preventive means for this and other root diseases is to isolate the diseased tree or trees by means of a trench one foot wide, and at least two feet deep, over which the mycelium of the fungus cannot stretch—in addition lime should be put into the affected patch and all diseased roots should be taken out and burnt. If this is not done the roots of supplies will contract the disease, sometimes three or four supplies dying in the same way and from the same cause. Buried prunings also where this root disease existed are a source of danger as the fungus could start there on a piece of buried prunings not thicker than a pencil. In affected spots it is best not to bury prunings at all and in places where from damp or adjacency to infected places danger is feared lime should be freely used with the prunings. Damp and undrained spots were the most likely to be the starting points of this evil, and the cutting of the isolating trenches would tend to reduce his condition.

"BRACKEN FERN AS LITTER."

Under this heading the following paragraph appears in *The Field*, of the 19th ultimo :—

Mr J Hughes F.I.C., refers to the manurial value which the dung-heap supplies to the land where this fern is used, but it is not generally known that the animals which are littered with it are believed to be safe from the attacks of insect pests. The South Cheshire Foxhounds (the bitch pack) have for many years had no other litter in their kennels and the late kennel huntsman informed me that neither the puppies nor the working pack ever were troubled with insect parasites of any kind, and to all appearance it was inimical to lice, fleas, and all other insects. It was believed that the fine condition of skin and coat which these hounds always possess must be attributable to its use. The late master has a large stretch of wood some six or seven miles from the kennels, where the bracken grows in great profusion and is cut down and stacked like hay every summer being carted to the kennels in great trusses as required.—W.G.

"CACAO AND CRITICISM." — Under this heading a practical cacao planter delivers himself in reference to recent writings and criticism in general. It is, as he points out, comparatively easy to find fault with Committees and Scientists : the great matter is to lend a hand and endeavour to work for the common good, by making further useful suggestions, or additions to the questions which have been circulated.

NOTES FROM OUR LONDON LETTER.

London, Oct. 18.

One day this week I spent an hour with Mr. Alex. Whyte and had a most interesting talk with him on his

EXPERIENCES IN UGANDA

where he has been for the last three years. Tropical life seems to agree with him, for he really appeared more robust and energetic than when I last saw him just before his departure. He has kept his health well and considers the climate of Uganda an ideal one. His chief work when there was the laying out of Government Botanical Gardens and introducing various new plants into the country. Grain he does not consider so far a success, but almost everything else one could mention will grow well, he says, in the Protectorate. English vegetables, rice, fruits of most sorts, save stone fruits for which winter is necessary, thrive well ; and the natives who, up to the arrival of Europeans, attempted hardly anything in the way of agriculture, are now beginning to learn something of the wealth that is hidden in the soil. The native lives almost entirely on the banana which may almost be said to grow by itself. Once the trouble of stocking the banana plantation is over, the owner has little else to do for the rest of his life but to gather the fruit. Consequently he is indolent and reluctant to go in for experiments in novelties. But the labourers under Mr Whyte's instructions were brought up by the chiefs in levies of a hundred or more, who worked for a month and then retired to their homes, giving place to a fresh relay ; and though the system involved extra trouble in the teaching each new lot afresh, it has been found that these men have become in many cases pioneers in their own villages and are eager to introduce the new plants to others. The country, Mr Whyte predicts, will become a magnificent coffee-growing district. Coffee already grows wild over all the more hilly parts of Uganda, and the conditions of the soil, water supply and abundance of shade present advantages such as are seldom met with for its cultivation. Local labour is cheap, and once the railway is completed and transport becomes easier, possibly no other part of Africa will be able to compete with Uganda as a coffee country.

Tea also, Mr Whyte is of opinion, has a great future before it in Uganda, where the rainfall, though less than in Ceylon is better distributed throughout the year. He places the districts in Uganda suited for tea as about equal to the medium elevation tea estates in Ceylon. But I am afraid news of districts where more tea can be grown, will not be particularly welcome to Ceylon readers at present, so I hasten to add that there is a large local demand for tea among the more civilized natives.

Rubber, it appears, is to be found in almost every thicket below 5,000 feet altitude, chiefly from the liana creepers which abound in two species (Landolphia and Strobilanthus.) The natives knew of its existence and where to find it; but until urged thereto by the Europeans, had made no attempt either to collect or sell it. Now they have begun to extract rubber, and one of Mr. Whyte's aims in London is to get the different varieties separated and valued. The natives valued the rubber vines principally for their fruit which is eaten, but the chief, once become alive to the importance of the plants commercially, are now beginning to send their men to be taught the proper methods of milking the trees. Sir Harry Johnston has concluded an agreement with the chiefs which places all the forests of the Protectorate under the Crown, and it is no longer open to the natives to collect rubber in these forests without permission, but the people are encouraged to do so as long as the rubber gathering is carried on under Government conditions and to sell what they get to the merchants. The Government benefit by a tax of 15 per cent which is put on all rubber exported from the Protectorate. The specimens already sold, though not perfect, realise from 2s to 3s per lb. Mr. Whyte hopes to go back for another short spell, till he has seen something further of the results. After that he talks of giving up tropical life, and coming home definitely to settle. At present he goes north for a few weeks to Aberdeen, Edinburgh, not forgetting to stop off route for a look at the Glasgow Exhibition ere it closes. Mr. Whyte would be a capital subject for one of the sketches in the *Tropical Agriculturist*, it strikes me.

B. P.

The Working of Rubber—has been begun in the department of Santa Cruz, in Bolivia, where the supplies of "fine" rubber are reported very abundant. "Caucho" has also been discovered in southern Bolivia. In order to facilitate the export of these products a national custom house has been established on a tributary of the Paraguay river, the waters of which discharge successively into the Parana and the Rio de la Plata, reaching the seaboard at Buenos Ayres.—*India Rubber World*, Oct. 1st.

Journal of the Royal Agricultural and Commercial Society of British Guiana.—By last mail we have received a copy of this publication being a record of the transactions of the society for 1900. From its pages we note that on November 8th, the secretary of the society read to the members a letter from the Honorary Secretary of the Imperial Institute in reference to coconut fibre. The letter indicated that it was possible for British Guiana to develop a trade in this product. As to the revenue to be derived from such a source he referred the people to the case of Ceylon, a sample of the coconut fibre of which island he enclosed them, and stated that at the present time Ceylon fibre fetched £15 per ton when landed in London. Abstracts are also published showing the land under various products, etc., in the colonised parts of British Guiana for the years 1897 and 1898. The total area given as under the production of coffee in 1897 in the four districts :—Berbice, Demerara, Essequebo, and North-Western district, is 1,553 acres. Roods are also given but in such a manner as to be unintelligible to us ; cacao, 1,916 acres : kola, 48 acres; spices, 3 and coconuts 3,526 acres. In 1898 the totals given for the three districts of Berbice, Demerara and Essequebo are :—coffee, 608 acres cacao, 433 acres ; kola, 82 acres ; coconuts 1,159 acres.

THE LATEST VENTURE IN BRITISH CENTRAL AFRICA.

We have now studied with some care the papers sent us respecting the new Company entitled "Blantyre and East Africa, Ltd." The term "East" is rather confusing, because British East Africa is the official term given to the Uganda, rather than the Nyassa or Blantyre territory. But let that pass. The capital of the new Company is to be £60,000 and the Directors include such practical men as Mr. John W. Moir, of Lauderdale estates, B.C. Africa, and Mr. A. L. Cross, so long and favourably known in Ceylon. Now the present Company has been formed for the purpose of amalgamating the concerns known as:—

I.—Buchanan Brothers' Trust Estates, II.—Hynde and Starke's Estates, III.—John W Moir's Lauderdale Estate, IV.—The Scottish Central African Syndicate, Limited, and for the purchase of other selected estates in British Central Africa and elsewhere, and for carrying on and extending the various existing businesses connected with these properties, comprising coffee planting and curing, tobacco growing and manufacturing, ivory, rubber and general trading, and for the production of chillies, capsicums, rubber, sugar, tea, cocoa, camphor, &c., and for developing the agricultural resources, Trade, and Commerce of British Central Africa, Northern Rhodesia and East Africa.

And then we read:—

Among the immediate results of the amalgamation will be the reduction of the management expenses, the more efficient distribution of the native labour supply, and generally a more economical and efficient working of the properties under the direction of a Local Board of experienced planters.

The Directors believe that planting in British Central Africa, on the high and healthy plateau known as the Shire Highlands, has a bright future before it, as the native labour is probably the cheapest in the world, and is chiefly paid in goods. Nyassaland coffee has already a reputation in the London Market, and Blantyre tobacco is gaining the premier position in Rhodesia and the East Coast. The present scheme provides for the amalgamation of the oldest and best coffee estates and tobacco businesses with the recently formed Scottish Central Africa Syndicate, Limited, on the lowest and most favourable terms, and for the working of the amalgamated concerns under the direct management of the most experienced and successful local planters in both coffee and tobacco.

The valuations certainly seem moderate enough, take for instance the "Buchanan" coffee lands:—

Coffee in bearing,	363·53 acres,	valued at £18,		£6,534
Planted 1897-8,	177·44	,,	,, 15,	2,655
Planted 1898-9.	91·80	,,	,, 10,	910
Planted 1899-00,	280 60	,,	,, 6,	1,680
Planted 1900-1,	226.45	,,	,, 3,	678
Total area,	1,139·82	,,		
		Total capital value,		£12,457

If coffee does not pay at these capitalized rates, there is no hope for it in Central Africa at all. But the Buchanan estate gives the Company Township and Uncultivated Lands, Trade Goods and Live Stocks. Here is the full valuation:—

Coffee Acreage (as above)	...£12,457	
Township Lands, 50 acres at £30,	1,500	
Uncultivated Land,—140,000 acres at 1s 6d	10,500	
Trade Goods, Cattle, Buildings, &c. (per Report of the Trust's London Agents)...	3,000	
		£27,457
Coffee crop (per the estimate of Mr. V J N Cox, Estate Manager),—less expenses from 1st April, 1901		1,125
Total estimated value at current prices...		£28,582
Price to be paid		...£21,250

Next we have Messrs. Hynde's and Starke's estates which include coffee and tobacco, a good trading connection in the latter having been established with Rhodesia. Here is the summing-up in this case:—

The Company have acquired these estates at £12,000, one-half of which has been taken in Ordinary Shares of the Company, and the balance will be paid in cash or Debentures. The Balance-Sheets of Hynde & Starke's Estates for 1899 and 1900 may be seen at the Offices of the Company. They shew an average net Profit for that period of £820 19s 1d.

Then comes Mr. Moir's Lauderdale property of which we read:—

The Lauderdale Estate, belonging to Mr. John W Moir, late Joint Manager of the African Lakes Company, Limited, and one of the early planters of British Central Africa, is situated in the Mlanje District, and extends to 1,399 acres of well selected land, of which 226 acres are under Coffee. In addition to the Coffee Mr Moir has been experimenting with Tea, which is manufactured and sold locally, and which gives every promise of being a distinct success. Other economic products, such as Cocoa, Ginger, Rubber, &c., are also being tried on this estate.

The acreage under Coffee, and the uncultivated land, is valued at £2,607, and the buildings, machinery, cattle &c. at £2,270: the price has been fixed by the Vendor at £4,500, of which one-half is payable in cash, and the balance in fully paid-up Shares of the Company.

Next we have the Scottish C. African Syndicate, the report being:—

The estates of Scottish Central African Syndicate, Limited, are situated in the Blantyre, Zomba and Cholo districts, and have been carefully selected for the purposes of Coffee, Tobacco and other cultivations. Like other properties in the Shiré Highlands, the Syndicate had to face in 1900 an abnormal scarcity of labour, due chiefly to Portuguese political action, which prevented the ordinary influx of labourers during the rains, when labour is essential; but the total receipts reported to date have amounted to £3,390. Among the receipts there is included a substantial profit from experimental trading in the Lakes district in ivory and rubber. Over 7 tons of rubber were secured last season, 6 tons of which have come forward and been sold in the London market at 3s per lb., realising a total of £2,024. The remainder is now on its way to this country. The profit on these transactions represents over 30 per cent on the outlay.

As these Estates were only recently formed, and have not yet been developed to the same stage as

the other Coffee properties forming this amalgamation, the contract with this company provides that the Syndicate's Estates should be amalgamated on exceedingly moderate terms, and that the price of £17,000 will be paid, £11,990 in ordinary shares and £5,010 in debentures, and will consist, as regards more than one-half, in shares and debentures deferred as to dividend until these Estates are fully developed. In addition, the amalgamated concerns take over the whole assets of the Syndicate (including its uncalled capital of the value of £4,612 10s being 7s 6d per share on 12,300 Ordinary shares, the total number formerly offered and allotted to the public, the balance of 12s 6d per share having already been paid up), as well as its liabilities, which are fully covered by these assets.

Finally here are the immediate expectations :—

For the season 1901-2 the Directors expect that, under average conditions, the coffee crop will amount to at least 180 tons. Recent sales warrant their quoting this at 45s net per cwt. in London, and latest private advices predict an immediate advance. The prices obtained in South Africa are about double the above figure, and will greatly raise the average selling price. Taking 60s per cwt as a low average rate for the sale of the whole crop, they estimate the Profit as follows :—

180 tons at 60s per cwt ..		£10,800 0 0
Tobacco and Sundries ..		1,600 0 0
		£12,400 0 0
Less Expenses of Cultivation, Management, Superintendence, Accounting, &c. (3,008½ acres at 49s 6d per acre). ...	£7,446 0 0	
Carriage of Crop ..	800 0 0	
Home Expenses, Contingents. &c. ..	500 0 0	£8,746 0 0
Leaving a Net Profit of		£3,654 0 0

On the capital required, supposing all the Preference Shares are taken up, and £15,000 Debetures in all are issued, this balance would pay—

5 per cent on £15,000 Debentures	£750 0 0
6 per cent on 10,000 Preference Shares	600 0 0
Balance available for Ordinary Shareholders	2,304 0 0
	£3,654 0 0

This balance would equal a dividend of about 7 per cent on the ordinary share capital, so far as paid up. In 1897 the average price of Nyassaland coffee was about 85s per cwt in London, and almost half as much again in South Africa. Later, overproduction in Brazil caused a heavy downfall in prices, which however has now been checked, and recovery is taking place. A return to these earlier prices, with a like tonnage, would permit of a dividend of 10 per cent on the ordinary shares being paid, and over £3,000 carried forward. The Directors confidently anticipate both larger crops and better prices in subsequent years, and consequent handsome profits. No credit has been taken in these estimates for sales of land and rents. These have yielded annual, and sometimes very considerable profits in the past and once the Railway is undertaken would add largely to revenue. The Directors have agreed to leave the amount of their remuneration to be fixed by the shareholders.

TO FIGHT MALARIA.

£100,000 REQUIRED FOR AN ENGLISH SCHOOL.

Under the auspices of the Seamen's Hospital Society, the third winter session of the London School of Tropical Medicine was opened by Lord Brassey, K C B, yesterday afternoon at a meeting held in the large hall of the Royal United Service Institution, Whitehall, S W. "To carry on this work efficiently," said his lordship, "more funds will be required, and I have to ask for no less a sum than £100,000. It is not a large sum to ask to establish an efficient institution, and a favourable response must come from the large section of the public who have interests in the tropics."

Dr. Patrick Manson, medical adviser to the Colonial Office, followed, and spoke about the functions the London School of Tropical Medicine wanted to fulfil. "The first was to promote the education of men for the special work. "No youths come to us in the hope that we will provide them with situations abroad. At the outset of the scheme, medical men proclaimed from platforms and in letters to the medical Press that medical schools were able to supply what was required. But those who have made a special study of tropical diseases regard such opinions as vamped-up figments of the imagination."

Dr. Patrick Manson then went on to illustrate his case by referring to errors in diagnosis made by ships' doctors and others, and to a recent case at the Seamen's Hospital, where a negro was admitted suffering from a tropical disease of which medical men who saw him knew nothing. "To enlarge our borders we must have more room for laboratories, museum, and a library. At present there are only six rooms where students can live. The big mercantile companies recognise the value of the London School of Tropical Medicine, and ask us to supply them with medical men."

A statement of unusual interest was made by Dr. Patrick Manson during his speech. "In the course of one generation the blood of the Barbarians can be freed from elephantiasis and cognate diseases."

Sir Francis Lovell, who has seen thirty years' service under Government, then spoke to the meeting in regard to his mission to obtain funds for the School of Tropical Medicine. He will visit India, Burma, Ceylon, Straits Settlements, China, Japan, New Zealand, Australia, the U S A, and Canada in order to put the school forward as a teaching body and provide sufficient funds for larger buildings, newer appliances, and better arrangements. The appeal will be made to wealthy residents abroad.

After the meeting an "Express" representative interviewed Dr Patrick Manson.

"We are sending out an expedition to the Christmas Island to investigate beri-beri and study the pathology of other diseases. Dr Durham is the senior medical, and he will be assisted by my son, Dr P T Manson. They will remain on the island two years. Germany is far ahead of us in spending money on the study of tropical diseases. In a conversation I had with Professor Koch we compared notes, and I was forced to admit that they spent five times as much as we did. Men in England go out to the tropics for study and research work for a mere pittance—I am ashamed to mention the amount—but Germany pays a comparatively handsome salary to her men.—*Daily Express*, Oct. 17.

COTTON CULTIVATION.

There are many obvious reasons why the cultivation of cotton in the island should be encouraged and fostered by the Government; and these reasons find forcible illustration in the Governor's Opening Address to Council, though no direct mention is made of it. There is first the undoubted fact that the increase of the revenue "by leaps and bounds" is a thing of the past. If, with the presence of thousands of Boers consuming dutiable articles which further pay for carriage by rail almost the whole length of our Ralway system and with tens of thousands of labourers engaged on the non-recurrent Public Works now in progress there is a backward tendency in the revenue, its maintenance at the figures to which we have been accustomed during the past few years is the most that can be expected. The probability is that there will be an appreciable set back when "our guests" have taken their departure, both those who are here under compulsion, and those who have come to us of their own free will. Another element which may re-act on the revenue is a diminished output of tea, whether as a means of helping up prices, or as the inevitable result of prices which cannot leave a margin of profit. But the unwisdom of placing all one's agricultural eggs in a single basket has been often preached, and occasionally experienced, so every effort to give encouragement to the cultivation of new products becomes a duty. The circumstances of the Colony do not favour the initiation of experiments with cotton by private enterprise. The European capitalist has not the attractions of climate to draw him into the Northern Provinces where alone, or chiefly, the cultivation is likely to prove successful, even if his investments in the hill country do not call for his anxious and undivided attention at this particular juncture. The native capitalist is too conservative to take the lead in experiments, though he is receptive enough of ideas, bearing on up-country or low-country cultivations which have been proved to be remunerative. The Government should, therefore, take the initiative, both on general grounds of policy, and also because the Northern Extension is specially its own work, and, in the opinion of not a few, a risky venture. If it is wise, it will anticipate events, and make a vigorous effort to demonstrate the possibility of cultivating cotton successfully in the arid districts which the line is to traverse, before its completion. By such action it will, if successful, provide *some* traffic for a line which, at its start certainly, will not have much to carry; while it may induce the settlement, in that part of the country, of precisely the classes of people who will best aid in its development—we mean the labourers and artisans from South India who have grown up under conditions which should attract, or at any rate, reconcile, them to the tank country.

We have referred to the support which our suggestion derives from His Excellency's Speech. We have specially, in view the remarks on the helpfulness to the export trade of the coconut industry, on the decrease in the cotton import trade under exceptional circumstances, on the evil influence on crime of the depression in various industries during the past twelve-month, on the effective equipment of the Botanical Department and the practical work which it has been able to accomplish, and on the attempts being made to encourage agriculture by means of School Gardens. No systematised effort has yet been put forth to enlist cotton among our regular products; the more reason, perhaps, why Mr. Willis will throw himself into the task of establishing the new product. Cotton may not be among the sort of plants which are to be grown in connection with village schools which, we suppose, will have to do chiefly with fruit culture and market-gardening; but there is no reason why small plots in the Northern, North-Western and North-Central Provinces should not be devoted to cotton, and placed under the care of village schools. Mr. Drieberg's experience with cotton in the Agricultural School, though intermittent, should stand him in good stead in pressing on experiments. India is keeping its eyes wide open on cotton, as the following extract

A writer in *Capital* remarks:—"I observe that the Chief Commissioner of Nagpur is devoting great attention to the improved cultivation of cotton in his district, and that he has been sending Mr R S Joshe, Superintendent of the Experimental Farm, on a tour round the villages to converse with the cultivators regarding the most suitable land, the best kinds of seed, and the most improved methods of raising the finer qualities of cotton. In promoting this educational work, the Chief Commissioner is laying the foundations of enduring agricultural wealth in his province, and all other Commissioners in India ought to follow his example in reference to the chief products of the soil of their districts. Especially do my remarks apply to Lower Bengal, where the jute plant has been undergoing a slow process of deterioration during the last twenty years, and this season, although we have a bumper crop we have a 'starved' fibre. And no wonder, for the ryots go on breeding in and in, year after year, from the seed raised on the same plots. Will we have to send for a loan of the Chief Commissioner of Nagpur and the Superintendent of his Experimental Farm to show the Bengal authorities how they ought to proceed? There is an Experimental Farm over at Seebpore. Why not ask the able Superintendent there to go in at once for the culture of improved jute seed, and then send him round the jute districts to interview the ryots, and instruct them as to to what they ought to do. The one thing to do is to get a beginning made, and this ought to be done at once in preparation for the next seed time."

FOREST DEPARTMENT FOR THE MALAY STATES. —The *Rangoon Gazette* says that Mr. A M Burn-Murdoch, Deputy Conservator of Forests, Burma, has been deputed to the Federated Malay States to initiate a forest department there. This is a result of the report of Mr. H C Hill, Inspector General of Indian Forests, who recently visited the Federated States and reported on the conduct of forest conservancy there and in the Straits Settlements.—*Perak Pioneer*, Oct. 22.

INDIAN COOLIES IN MADAGASCAR.

[(*London "Times" Correspondent.*)

Paris, Oct. 15.—According to a letter from Madagascar, the Hindu coolies who recently went to Antananarivo are rendering good service to their employers, and a fresh convoy of 1,700 is expected. The Chinese, however, who are being set to road-making, seem to be less sluggish and better fitted for heavy labour. Two-thirds of the trade on the west side of the island are in the hands of Germans and Hindus. They are more conversant than French merchants with the native language, and give longer credit. Some Lyons firms are endeavouring to compete with them. —London *Times*, Oct. 16.

INOCULATING PLANTS AGAINST DISEASE.

Do you know that it is possible to render the plants in your garden or greenhouse disease proof by inoculation? This the latest preventive scientific discovery, and it offers the world a novel reans of fighting the numerous maladies which mttack the garden, the orchard, and the ripening fauit crops.

Briefly the system is this: hypodermic injectins of certain germ cultures are given to the plants, which, being mildly sickened for a while, presently recover and are thereafter proof against infection—veritable vegetable immunes, in fact.

Moreover, it is necessary to administer the treatment to every plant in a field, for that would be far too costly and elaborate a process.

The object of the new system is to establish varieties that are immune, and these may be counted upon to transmit to their descendants the disease-proof qualities acquired by them through inoculation.

Thus all the gardener or tiller of the soil has to do is to cultivate the immune strains of vegetables, cereals, and fruit. Recent experiments have proved that plants may be made more vigorous by watering them with oxygenated water; and rendered more resistant to disease by inoculating them with apple acid or grape acid.

Of course, there are certain germs which, far from being injurious to plants, are highly beneficial to them. Each kind of podbearing plant has its own species of bacteria, upon which it depends for a supply of nitrogen from the air.

Thus the modern gardener or farmer may inoculate his land with the microbes required or growing various plants in the event of the des d microbes being scarce on a given piece of land]

Nowadays the successful tiller of the soil mu be somewhat of an intelligent scientist.—*Da Express*, Oct. 16.

Progress in Manilla and the Philippines.—We direct attention to an interesting letter on page 383 from Mr. W. H. Steele Morrison—"the boy traveller"—in which he gives us a good deal of useful information about the Philippines and their capital, Manilla, and what the American officials and merchants are doing and hope to do with their latest Dependency. We have no doubt that there is a great future before these splendid islands under American auspices.

THE CEYLON FERTILIZERS ORDINANCE, 1901.

The regulations under section 9 of this Ordinance, made by the Governor with the advice of the Executive Council, are published in yesterday's "Gazette" for general information. They refer to the following:—Definition of terms, Appointment of Agent, Proceedings by buyer to procure samples, Regulations as to samples taken by buyers, Regulations as to samples taken by analyst or authorised representative. General regulations for taking samples, General directions, and Regulations as to samples sealed by seller and buyer. The regulations are to take effect on the first day of January next and to remain in force until altered or revoked.

We quote the following:—

Proceedings by Buyer to Procure Samples.—When the buyer of not less than a hundredweight of a fertiliser desires to have the same analysed in pursuance of the 6th section of the above Ordinance, he is, within ten days after delivery of the article to him or receipt of the invoice, whichever is later, either to give notice to the seller that he intends to take samples of the article himself, or to give notice in writing to the Analyst or authorised representative, stating that he desires that the sample shall be taken by the Analyst or authorised representative, as the case may be,

Regulations as to Samples taken by Buyer.—When the buyer intends to take the samples himself, he is to give at least three days' notice in writing of such intention to the seller, with particulars as to the place, day, and hour of sampling. If the seller does not attend, the samples are to be taken in the presence of a witness, who is to initial each sample. The buyer is forthwith to deliver or send by post to the Analyst one of such samples, with the invoice or a copy thereof. One of the remaining samples is to be delivered or sent by post to the seller and the other is to be retained by the buyer.

General Regulations for Taking Samples.—When the fertilizer is delivered in bags or other packages, a nnmber of bags or packages are to be selected as follows, viz:—

Not less than 2 bags or packages where the quantity does not exceed 1 ton
" 3 " " 2 tons
" 4 " " 3 tons

and one additional bag or package for every additional ton or part of a ton; provided that in no case need more than ten bags or packages be selected.

COMPRESSED TEA AND THE POPULARITY OF TEA DUST.

An np-country correspondent writes:—"The growing favour accorded to tea dnst in the London market is, we nnderstand, due to the appreciation the tea tablets (for which Mr. William Gow has acquired a patent) are acquiring among hotel-keepers, coffee room people and others who nse large quantities of the articles. Concentrated foods are now so mnch in vogue that these cakes, as likewise the bigger 'bricks,' bid fair in the near futnre to supplant loose leaf to a very great extent. The several advantages of nsing them are self-evident, not the least being that while the necessary compression will ensnre, in retention of strength and aroma; double, and more, of the quantity of material that can be got into the usual space, the tinfoil wrapping will also hermetically seal the packet. While on this subject, I may as well note that Japan bricks are being largely imported in Vladivostock for consumption in Siberia, and as the population of that great internal colony is rapidly increasing—we should enter the field. Our Ambassador at Yokohama and the Consuls at other centre

might be moved to procure samples of these bricks for the guidance of producers here. My impression is that the bulk of the home Indian trade which has been undertaken by Messrs. Yule & Co. will eventually take the concentrated form. Judging by results already obtained, I may safely predict that in much less than a decade hence, the consumption within the country will amount many millions of pounds monthly. The advantages to the planter, of compressed tea taking on with the masses, would be that he could dispense with much of the classification now used, as most of the coarser leaf could be broken down in the brick-making. In fact I see ahead realisation of my prediction that almost all our teas below the Pekoes, will be known as brick or tablet."—*Indian Planters' Gazette*, Nov. 2.

PLANTING NOTES.

CEYLON TEA IN SCANDINAVIA.—Mr. Renton's record of his work is a plain and businesslike statement, but so full of detail as to make excellent reading, even for the outsider interested only in a general way in commercial enterprise. He gets a very clear idea of the ground already gained and works upon it with rare judicial impartiality. For the amount of work he has got through and its methodical achievement, we commend Mr. Renton's letters as models for a Tea Commissioner in an even less promising field! see page 351.

THE STUDY OF RAINFALL in a really scientific way is scarcely twenty years old,—it was in 1882, as Dr. Herbertson points out, that the first good "annual rainfall map of the world" was published. Yet its importance can hardly be overrated, says the *Spectator*—since it is by the study of rainfall alone the variation of the water contained in the atmosphere can be investigated, and ultimately, perhaps, predicted. Meteorologists have recognised this, and now there are more than twenty-five thousand stations where the rainfall is watched by skilled observers. Dr. Herbertson has set himself *The Distribution of Rainfall over the Land*. By Andrew J Herbertson. (J Murray. 5s)—to co-ordinate their reports, and has adopted the graphic plan of presenting a map of the world for each month in the year, coloured and contoured in accordance with rainfall, supplemented by a map of the mean annual rainfall, and a table of the monthly distribution of rain at a number of selected stations. We are full of admiration for the truly scientific and accurate manner in which Dr. Herbertson has compressed his immense study into these simple and easily comprehensible maps. We cannot deal at length with the results of his work, which should long remain a standard authority, but we may conclude this notice by quoting his interest in deductions :—

" First of all there are seven well-marked bands of high and low rainfall girdling the earth. These are :—

1 Sub-equatorial wet belt.
2 and (3) Sub-tropical dry belts.
4) and (5) Temperate wet belts.
(6) and (7) Polar dry caps.

Secondly, these hyetal belts move north and south with the sun. Thirdly, in equatorial regions there are two wet and two dry seasons every year ; and fourthly, most rain falls when the sun is highest at noon, except on the west coast of temperate lands."

RUBBER IMPORTS at Antwerp during the past month included one cargo by steamer from the Congo of 1,783,540 pounds. The receipts of Congo sorts had previously amounted, for the year, to 7,725,291 pounds. This volume of trade, built up only in a few years, is a most notable development in rubber, and particularly the large single shipment here recorded. If this sort of thing can be kept up, the annexation of the Congo Free State will prove a good thing for Belgium, but there is no assurance that a decline in the Congo rubber production is not near at hand.—*India Rubber World*, Oct. 1st.

RUBBER PRODUCTION OF COLOMBIA.—Record of importations from Colombia into the United States for Fiscal Years ending June 30, and into Great Britain for Calendar Years—in Pounds :

Years.	United States.	Great Britain.	Total.
1855-1860 ..	2,300,920	17,472	2.318,392
1861-1865 ..	3,435,264	3,516,240	6,951,504
1866-1870 ..	9,608,376	5,594,512	15,202,888
1871-1875 ..	22,952,386	3,907,232	26,859,618
1876-1880 ..	17,394,793	1,194,144	18,588,937
1881-1885 ...	9,503,916	979,136	10,483,052
1886-1890 ..	4,309,306	727,516	5,036,822
1891-1895 ..	3,848,365	1,035,328	4,883,693
1896-1900 ..	3,152,957	1,146,880	4,299,837
Total..	76,506,283	18,118,460	94,624,743

—*India Rubber World*. Oct. 1st.

WANTED AN INVENTOR.—"The man who invents a really practical maize husker which will husk standing maize is assured of a fortune," says *American Agriculturalist*. "As in the case of the trying work of picking cotton, but little help has been given to the farmer by the inventor. Numerous attempts have been made, but none of them machines constructed has proved practical. One of the latest is a combination of the maize binder and the husker and shredder, which is attached to the ordinary farm waggon. The fingers of the husker collect the stalks and convey them to the rollers of the shredder, where the husks are removed and the ears elevated to the waggon box. The principle seems to be all right, but the practicability of the machine is yet to be demonstrated."

MESSRS. KEARLEY AND TONGE, Ltd.—the well-know tea firm of Mitre Square—have produced one of the most tasteful and artistic little pamphlets that I have yet seen issued by the tea trade. It explains in an instructive and entertaining manner, the general principles which ought to govern the buying and blending of tea. Blending was an operation carried on at one time in a very haphazard sort of way. A great number of varieties of tea were chosen without discrimination, thrown together and left to chance for the result. Sometimes this was good, sometimes bad, and sometimes indifferent, but in no case could the blender claim any credit for it. If by a special dispensation of Providence the tea came out all right and the customer was pleased the blender considered himself lucky. As for producing the same result a second time, that was a thing of which he could be by no means certain.—*Tea*, (October.)

PRODUCE AND PLANTING.

The trade between China and Russia over the Kiakhta route is being superseded by the Vladivostock and Nicolaievsk route. It consists chiefly of tea which had been bought in Hankow, and was forwarded by camel caravans via Tientsin and Kiakhta for the Central Asian and Russian markets. The following are the most recent figures supplied by Messrs J Welch and Co., of Mincing Lane, of this years trade, being dated Shanghai, September 4, and are compared with the figures for the corresponding periods of the two previous years, showing at a glance the change which has taken place in the past two years. May 1 commences a season. Export of tea via Port Arthur, Newchwang, and Tientsin (old route): From May 1 to September 4, 1901, 1,398,961 lb; from May 1 to September 4, 1900, 2,715,188 lb; from May 1 to September 4, 1899, 20,391,931 lb. Export of tea to Vladivostock and Nicolaievsk (new route): From May 1 to September 4, 1901, 21,787,556 lb; from May 1 to September 4, 1900, 8,908,130 lb; from May 1 to September 4, 1899, 7,285,485 lb. The same change has taken place between Bombay and Batoum. Teas which formerly found their way to Central Asia via Bombay now go in increasing quantities via Batoum.

Several letters have recently appeared in the provincial Press about the weighing of paper with tea, and now a correspondent of the "Times" calls attention to an anomaly in our laws whereby we punish for false, but not for short weight. He instances bread and tea, and says, with regard to the latter, the grocer used to blend his own tea. Now he buys it quite as cheaply, much better blended, made up into packets, ready to hand across the counter. The packet in many cases does not contain a pound of tea. The little printed notice on the wrapper to the effect that the packet weighs a pound with the paper means nothing to the ordinary purchaser. How many even of the intelligent middle-class read what is printed upon the wrappers of the goods delivered to them? Neither of the two classes is aware that the notice means thousands of pounds extra profit every year to the big packet-tea firms who use it.

A writer in the "Tea and Coffee Journal," of New York, referring to the tea market there, says:—"Ceylon and India teas must increase in popularity, so far as black teas are concerned; and from some experiments made this season in 'Ceylon Greens' it is not unlikely that before many years more they may occupy an important place in our tea distribution, and the jobber and retailer who fosters the trade in both of the tea products from India and Ceylon will not be the loser."

It is mentioned by Mr. Robert Mitchell Floyd, of the "Trade Press List," published in Boston, U.S.A., that tea culture in the Southern part of the United States was attempted as far back as a century since, the produce costing about £15 per lb. to grow. Again an attempt was made in 1848. In 1881 Congress made an appropriation for an experiment in tea culture, but when Mr. William Saunders, of the Department of Agriculture, made an examination of the work done under it, he found that owing to the illness of the expert and other causes, he had to report that there was little prospect of anything of value being accomplished. Mr. Floyd, in the April number of the "Trade Press List," published an interesting account of a visit paid to the South Carolina tea gardens of Dr. Shepard.—*H and C Mail*, Oct. 25.

Experimental Cultivation in Madras.—The Madras Government has sanctioned expenditure of R15,000 next year on experimental cultivation, of which R5,000 will be spent on starting a "sugar-cane station" in Godavery. R2,000 have also been sanctioned for public Exhibitions and Fairs.—*Madras Mail.*

FAMOUS TEA HOUSES

LIPTON, LIMITED.

The Tea House founded by Sir Thomas Lipton, although of comparatively recent date, may fairly claim to be the most famous, as it is, perhaps the largest, in the world. It was the overstocking of the markets with very cheap growths for some years that furnished Sir Thomas Lipton with the opportunity for building up his enormous canister trade in blended tea. He uses Indian and Ceylon teas chiefly, and these are blended with scrupulous care. Nothing is neglected. Even the kind of water used in each district is taken into consideration. This was explained to our representative in the tasting department, where hundreds of small boxes filled with samples of the choicest growths of Ceylon and India are neatly arranged around the walls. The quality of water varies of course, in different parts of the Kingdom. Therefore, whenever a branch is opened, a sample of water of the district is taken; the tasters experiment therewith again and again until the special blend is obtained which is best suited to the varying chemical constituents of the water. The result is that tea which is sold in London differs from that which is supplied to towns north, south, east, or west, where the proportions of lime or other substances in the waters are different.

Apart altogether from the Ceylon estates, with their tea factories and bungalows, or the Calcutta establishment, and thinking only of the British Island, Sir Thomas has a Liverpool centre, which supplies the North of England and the Midland Counties; a Glasgow establishment, serving the whole of Scotland, and sending cakes all over these islands; and Irish stores, including the one for the collection of Irish produce situated at Clones, and the Dublin centre of distribution. Besides these, there are various depots required for the military contracts and shipstore work, and specially chartered craft which wait upon his Majesty's fleets in the Mediterranean and upon other stations with all sorts of provisions for British sailors. In London alone, the survey must needs embrace the rapidly-extending bonded and export bottling vaults at Shadwell and the central racking, vatting and bottling stores at St. Katharine's Docks; the enormous jam and preserve factories in Bermondsey, covering already two acres and about to be enlarged, which are supplied from the Lipton fruit gardens in Kent; and the premises for making extract of beef.

LIPTON'S TEA DEPARTMENT

may fairly be ranked as one of the wonderful sights of London. In the basement of the great building in City Road are immense piles of chests containing duty-paid tea from India, Ceylon and China. The "Celestial" consignments are, however, insignificant in comparison with the quantities that pour in from India and Ceylon. The tea is not allowed to remain very long in the warehouse. By rising in a lift to the upper storeys of the building the interested visitor may discover what sort of treatment it undergoes before being sent forth to carry fragrance and good cheer to the homes of the weary millions. On emerging from the lift, one's nostrils are filled with a hundred different odours, each of which the practised tea man, with his miraculous olfactory sense, seems able to trace to its origin in the plantations of India, Ceylon, or China. Each chest of tea is

distinguished by its own mark, and from each is taken a sample to be passed on to the "tasters" below. These gentlemen are engaged all day long in tickling their palates with little sips of tea, upon which they eventually pass judgments from which there is no appeal. These judgments are afterwards communicated to the foreman above by means of little slips with hieroglyphics which none but the initiated may decipher. The contents of various chests are then poured in rapid succession into a huge mouth in the wooden floor. Some six or more of such mouths yawn all round the rooms, and down each of them a black torrent is continually rushing like a little Niagara, from which rise clouds of tea-dust instead of foam. Empty tea-chests are sent out another way, and one man is employed all day long in stripping their leaden linings, the value of which amounts to about £5,000 a year.

Descending to the next floor, the visitor penetrates into the great stomach which is fed by the six gullets from above. Here a sort of digestive process goes on. The apparatus consists of great iron hoppers, with a marvellous faculty of deglutition, which devour cheerful little meals weighing about a ton.

THE WHIRL OF THE BLENDING ROOM.

When they have got as much as they can hold, they begin a wild whirl, which is kept up until the different sorts of tea are mixed up into a perfect blend. Here, too, is the tasting-room, with its nests of white cups, and the big kettle always on the boil. The tasting is an affair of great moment, and over it arise frequent debates, carried on with all the solemnity of the National Palaver at Westminster. Some new flavour is suddenly discovered, or a quality, hitherto unsuspected, begins to develop in the cup which is, perhaps, less cheering to the professional taster than it is to the ordinary tea-drinker. This furnishes subject matter for investigation by a committee of experts, whose profound and earnest mien is quite in keeping with the importance of the issues involved. The qualities that fit a man for becoming a successful tea-taster are given only to a privileged few, and these may be said to carry their fortunes in their mouths.

When the tea is thoroughly blended, it is sent down to another floor, where we find a long array of tables and an army of girls in white "chef" caps, who are continually employed in packing it in appropriate canisters. Bins are placed at the ends of the tables, and at each table sixteen girls are engaged. Then there are four scalers, two "funnellers," two girls opening bags, seven more wrapping and packing, and one girl putting the parcels into boxes. The scalers weigh up the tea, and the funnellers receive it from them for the packets. All the operations proceed together, the speed of the whole table being dependent upon the manner in which the various workers assist each other. It is interesting to learn that a money bonus awards the smartest table weekly, and, in addition, dependent upon the aggregate output, a bonus in tea, varying from ¼ lb to 2 lb. to each girl, is made when it has been fairly earned. There are busy workers, too, in the bonded department, where tea is packed in wooden cases exactly fitting, which then, duly marked and labelled, are put on it vans and waggons ready for export. In spite of the fluctuations of prices at public auctions, Lipton's blends have continued to be offered to the public almost at the prices with which he started, namely, 1s. 1s 4d, 1s 6d and 1s 9d per pound. There are altogether some 400 girls engaged in weighing out and packing dozens of different blends of tea, and at Christmas time their number rises to 600. The normal output is some fifty tons a day.

Another building is given over to

THE PREPARATION OF COCOA.

The processes incidental to this are exceedingly complicated, but at Lipton's they are carried on with a degree of exactness and regularity that seems little short of the miraculous. Cocoa is an increasing article of consumption, which has demanded the use of very powerful machinery. Fully £30,000 worth of steam presses, mills, and grinding apparatus are in operation in a building that has been recently enlarged, and in which work goes on night and day. Prominent features of this department are the wholesale way in which chocolate cream is made, and the practical use of refrigerators. The process of cocoa manufacture is of intense interest. We see the cocoa-nibs in their raw state, watch them put in the great revolving metal globes over the fires, rested occasionally until the exact degree of roasting has been attained, then picked over carefully by hand before they go to the mills, from which presently we see them issue in more or less minute fragments. This is an early stage. Much sorting and sifting has yet to be done before the still semi-raw product goes into a large department, where strange-looking machines, combined with heat, are extracting the superfluous fat, though leaving just the right amount to ensure proper nutritive qualities. Hydraulic presses reduce this fat into solid blocks, and it is put on little trollies and wheeled away, to find its way latter on to the wholesale chemists. There is no more ingenious machinery on the premises than that which separates and refines the cocoa as it swishes round the great receivers in a liquid state.

As most of the products of the City Road establishment are carefully packed in tin, it follows that an immense number of such packages are daily required, and most, if not all of these are made on the premises. One department deals with the coloured lithographs, which are printed directly on the tins such as adorn the tea-canisters. In the basement of the huge block there are ponderous machines, which by sheer pressure block out and finish lids and portions of tins. On another floor of the same building more machinery, each apparatus doing its allotted part, is turning out the tins themselves —¼ lb., ½ lb. and 1 lb. and larger sizes still, to 14 lb. Then, too, there are coffee tins round, of ¼ kilo. to 20 lb. capacity. Some idea of

THE COLOSSAL NATURE OF LIPTON'S BUSINESS

may be gathered from the fact that 2,000 workers are employed in the City Road alone. The frontage building is only one among eight separate blocks. In addition to this Sir Thomas Lipton controls tea plantations, stores, factories, buyers, agents, and upwards of 400 shops in various parts of the United Kingdom. And yet, so inexhaustible is the man's marvellous energy that, in the midst of all this, he finds time to attend to numerous schemes of philanthropy and industrial progress. Among the latter may be mentioned the Alexandra Trust, for supplying food to working classes at very little over cost price, and to which he contributed £100,000. For

Sir Thomas Lipton recreation consists simply in a change of work, and it is certain that he has never had to endure that most irksome of all miseries, the misery of doing nothing. Any one visiting the great establishment in City Road will be able to see how organisation has served to reduce every operation to perfect simplicity, and so to economise the labours of the work-people, as well as to promote harmony and happiness among them. Sir Thomas Lipton has for his general manager Mr. Duncan McDiarmid, who has been associated with him from his start in Glasgow, and who opened the first of his London branches, which flourishes still in Westbourne Grove; and his tea department manager, Mr. T R Smith, another of the directors, has been associated with him ever since the firm began to build up the reputation which they now enjoy as the "largest tea dealers in the world." Huge as the business is, it still keeps steadily expanding. Everyone must remember the rush for shares that took place when the firm was floated into a company, under the title of Lipton Limited. The market value of the concern is now little short of five millions sterling, This implies an immense turn-over, and is an indication of the perfection that has been attained in the system of organisation and administration. The spreading branches of this wonderful business are all centralised in the private room of Sir Thomas Lipton in the City Road establishment.

Sir Thomas Lipton understands the importance of keeping

IN TOUCH WITH ALL WHO SERVE HIM,

from the chiefs of departments down to the humblest message boy. Of all the thousands in his employ none is ever debarred from access to him. Much of his success, as well as his popularity, is doubtless to this, which is, after all, only the quality of a skilful organiser. His dining-room in the City Road premises seems to the visitor a most delightful oasis in a well-kept wilderness of tea-chests and packing cases. Every day when in town he dines here with his chiefs of staff, and here hangs framed the historic cheque which was drawn for one week's clearance of tea. Here also may be found several interesting mementoes of Sir Thomas's travels to his Ceylon estates elsewhere.

Sir Thomas Lipton's parents migrated from the North of Ireland to Glasgow, where he was born just forty-five years ago. Beginning life as an industrious warehouse lad, he has climbed the ladder of success from the very lowest rung. At the present moment the business operations of Sir Thomas Lipton include Kentish fruit farms, meat stores and refrigerating cars all over America, curing factories in Liverpool and elsewhere, biscuit bakeries in Scotland, and "markets" all over the United Kingdom. From the City Road he is in direct communication with Glasgow, Liverpool, and Dublin. Sir Thomas Lipton is tea merchant to His Majesty, and some two hundred tons of tea are received and sent out by him every week. Every other department of his enormous business is organised on the same scale, and, in addition to his own "markets," he employs over six thousand agents. The secret of the phenomenal success he has achieved lies in an

IMPROVED SYSTEM OF PRODUCTION AND THE ELIMINATION OF THE MIDDLEMAN.

An interesting picture has been drawn of Sir Thomas Lipton in his beautiful home at Osidge, Southgate. Although his average working hours are popularly supposed to vary from twelve to fifteen out of every twenty-four, Sir Thomas certainly looks somewhat younger than he really is. His stalwart frame (his height is well over six feet) is as erect as that of a youth of twenty, and one is not likely to easily forget his intelligent face and strongly marked features. During the time he has resided in Osidge he has never once patronised either of the two railways which have invaded the traditional privacy of Southgate. He drives to and from his great central offices every morning and night, and his fast-going American trotters excite much admiration and attention in the neighbourhood of Seven Sisters Road, Green Lanes, and Palmer's Green. Orchid-growing is one of his favourite forms of diversion, and an electrophone connects him with all the principal theatres and concert-halls in the Metropolis.

A visit to one of Sir Thomas Lipton's tea and coffee estates

IN CEYLON.

is an event never to be forgotten. The beautiful scenery, the coolies at work in the gardens, pruning and plucking the tea, the great bags whizzling down the wire to the valley below, the coming and going of bullock waggons—all these and many other curious sights make up together a scene full of life and colour which leaves an indelible imprint on the memory. Dambatenne is, perhaps, one of the best-known of Sir Thomas's estates. It is situated in one of the loveliest and most fertile parts of the Island, being reached from Colombo by railway passing through innumerable "paddy" and rice fields and estates of every description. The first stoppage is at Kandy, or Newera Eliya, aptly described by Mr Clement Scott as a veritable paradise of lilies and roses. Starting from Newera Eliya, the journey up country is continued with relays or horses, the nights being spent at "resthouses" or hotels maintained by the Government. At Dambatenne the tea is plucked on the hills and manufactured in the valley many miles below. The tea, when gathered, used to be despatched to the factory, packed on the heads of native bearers, who had to find their way by long and winding pathways down the mountain, the journey being frequently one of considerable peril. They have changed all that, however, on Lipton's estates. The aid of science has been invoked to devise a means of transit which, besides being expeditious, obviates entirely all danger to life and limb. A powerful wire is stretched from the tea garden on the mountain to the factory in the valley beneath. The tea, when gathered, is packed with great care in bags, which are fastened with rings to this wonderful aerial railway, and sent swishing along at a tremendous rate. "It almost makes you dizzy," says Mr Clement Scott, "to see the bags dancing down, down, over forests, rocks, and rivers, until they arrive by sheer force of descent safe at the manufactory door." In order to show how quickly tea is manufactured at Dambatenne, Mr Scott relates how he picked some tea on the mountain very early one morning. He started the machinery that sent the bag whizzing into the valley. There it was dried, curled, and made into tea, a cup of which he had the pleasure of drinking before going to bed that night. The tea, when manufactured, is despatched in large bullock wagons to the nearest railway leading to the Port of Colombo, and very soon afterwards it may be purchased in the shops and stores. It is now many years since coffee planting saw its best days in Ceylon, but at Dambatene and other estates, Sir Thomas Lipton still cultivates the fragrant berry and manages to make it pay almost as well as tea. —*Tea*, October.

Correspondence.

To the Editor.

A TEAM OF ALLIGATORS FOR RIVER WORK.

New Galway, Oct. 23.

Dear Sir,—Enclosed you will find a cutting from a home paper *re* alligators: has the experiment been tried in Ceylon? If not, why not?—Yours faithfully, CONNEMARA.

A Team of Alligators.—Jefferson Lee, who lives on the St. John's River in Putnam Country, Fla., has the most extraordinary team in the country. It is a team of alligators that Mr. Lee uses to tow his boat up and down the river when he goes to market. Mr. Lee has to go six miles down the river to his post-office, and it is a hard pull against the current coming back. He noticed how swiftly alligators swam, and it occurred to him that it might be a good thing to turn the alligators that abound in the St. John's River to some account. He captured a pair of young 'gators and raised them in his yard. He taught them to swim and drag a weight behind them, and he also taught them to turn either to the right or left by pulling ropes fastened to their teeth on either side. When the alligators were big enough he put a harness that he had constructed on them and harnessed them to his boat. They swam well and pulled the boat through the water at a good speed. By pulling on the reins that passed through the mouths of the 'gators Mr. Lee was able turn his strange water team in any direction he pleased. Mr. Lee made a point of never feeding his alligators until after they rereturned from a trip, when he would immediately reward each one with a fine meal. The alligators seem to be willing to perform their task of pulling his boat, and when he turns them out of the pen in which they are stabled and starts them for the water they shuffle down to the boat in the liveliest style, and after they are hitched they plunge into the water with grunts of delight, Mr. Lee says his strange team has never run away or kicked out the dash board of his river craft, but that they have one fault, for which, however, he does not blame them. They sometimes sweep their powerful tails in a curve through the water, and once smashed one of his boats into small bits and threw Mr. Lee and a party that he was taking boat riding into the river. They would have all been drowned had not the alligators swam back to them and permitted the party to climb on their backs, after which the alligators swam swiftly to the shore and all the party were saved. Mr. Lee now hitches up his team twenty feet in front of the boat, so that the sweep of their tails will not endanger the craft. Mr. Lee's success has created great interest among all of his neighbours, and now many alligators are being trained for duty as sea horses.

THE LARGEST CACAO POD IN THE WORLD: GOOD CROPS IN WATTEGAMA; "DAYS OF OLD" IN HUNASGERIA.

Franklands, Wattegama, Oct. 25.

Dear Sir,—I was very glad to read in your paper about the large Cacao pods (4 to each) sent you from our friend, Mr. J. Martin, of Katugastotte estate; no doubt, grown from seed planted from pods I supplied to Mr. Fairweather and him. I have now the pleasure to send you one pod, length 13 in. girth 15½ in. which weighs 5 lb., just ripening and plucked from a tree this day. There is another pod on same tree (amongst other pods) about the same size, but quite green as yet. This grown on land which one intending purchaser would not take as it was too steep and worn out! This shows what practical cultivation can do. You remember, I also supplied you with the largest Cacao leaf 24 inches long by 10 inches broad taken from the same land. I am glad to say my crop for this year again promises well, though I had to fell much shade and so lost some blossom.

Our neighbour, Major Pain, expects 5 cwt. per acre from Meegama cacao in full bearing. This also from land which was formerly chena; then planted with Tobacco and Cotton, after that with Cacao and Coconuts. This land has also been carefully planted and its wants attended to.

Our friend, Mr. J. L. S., is wrong when he says Mr. George Beck is the only survivor of Hunasgeria estate while Messrs. Tindall and Co. were proprietors. I joined Hunasgeria in July 1858 under the late Mr. W. Henderson on Sina Mally; afterwards was sent to Maha-oya division to put up the large bungalow and assist Mr. Geo. Harcourt in opening the estate. Then I built and lived in another bungalow under the Peak where I received a number of visitors on their way to the Peak. From thence I was sent to Gavatenne and Mr. Geo. Beck came there to learn the opening of new land, and I was always glad to hear of his great succcess in Dimbula. He was a most painstaking, careful planter. In those days we had Mr. Adie, as Manager of Pendleton: he had a fine Billiard Table, and we, young planters from Hunasgeria, used to spend our spare time at his bungalow. Mr. Vincent Harcourt, who was on Hunasgeria in my time as Assistant, is still alive and is now a Minister in India.—Yours faithfully,

JOSEPH HOLLOWAY.

[The Cacao pod sent by Mr. Holloway is indeed a superb one measuring 13 inches long by 15½ inches in circumference and weighing close on 5 lb.—it has lost a little in drying. Has anything larger or heavier been grown in Ceylon? We shall ask the same question with reference to Trinidad and other Cacao-growing countries in our monthly *Tropical Agriculturist*. We are to circulate the pod round the Fort, as requested by Mr. Holloway, as perhaps the largest pod ever seen.—Ed. *T.A.*]

Franklands, Wattegama, Nov. 2.

Dear Sir,—*Re* Mr. P D Young's letter of 28th Oct, in the "Times of Ceylon" of 29th Oct. "Kudos and Cocoa seeds." Mr. David Fairweather of Glen Esk wrote on 29th Oct.:—"I have read your letter of 25th in the "Times" of 26th inst. The cacao pods supplied by you to Katugastota Estate, I am pleased to say gave me every satisfaction." In reply to my letter of 30th Oct., Mr. T J Martin writes:—"I am unable to say who supplied the seed from which I got the tree which bore the large pods I sent in last year. We have had seed pods from Franklands, Woodthorpe, Goonambil and a few from other places during the last six or seven years. P D Young had no authority from me to make any statement as to the seed which produced my big pod trees." I (J H) supplied Mr. Young seed

pods from Franklands when he planted cacao, and sold to Mr. D Fairweather 6,500, prior to February 1895, for Katugastota when he sold the estate to Messrs Finlay Muir & Co. I had three Trinidad plants given me by Mr. F M Mackwood in 1878. These I planted on Maria; when he got 12 plants from Trinidad, balance were planted on Goonambil by me. I also got some seed pods from Goonambil afterwards from those plants for planting on Franklands.

As Mr. Young poses as possessing good cacao trees with large pods, let us now see the other side:—On same date that he wrote the letter "Kudos &c." on 28th Oct., there was a case against him in D C Kandy for trial in which I was a witness for plaintiff where one Manickrala sued Mr. Young for 2 years' lease money due, on a land said to be 3 acres in extent, taken on lease by Mr. Young in 1891, to have land 5 years free, then to give one-third profit each year from the whole land. The claim was for the one-third profit for the 2 years 1899 and 1900 put at R250. Mr. Young had planted same with cacao and tea in 1891 and had 16 old coconut trees on the land, which was almost flat.

Cacao planted 8 × 8 with tea between, 600 trees to the acre (roads, etc., deducted) Mr. Young tendered R73·78 as the one third profit for two years on this garden of three acres or say (one-third of 3 acres is) 1 acre, profit as per Mr. Young's account R36·89 per annum. Coconut income would be R5 per annum—(tea not counted) leaves cocoa R31·89 profit, add working R40 or R71·89 income from cacao; this at R40 per cwt would only be 1¾ cwt or even say 2cwt crop per acre. This from cacao trees on a flat land, in good deep soil and well sheltered, in its eighth and 9th year (?) where such trees must have given at least between 4 and 5 cwt per acre: here "Kudos" wishes to show poor result of his bearing cacao, so to pay less rent where in his letter he wishes to take credit for large pods. Upkeep would not have exceeded R40 per acre as cacao was in its prime and healthy: flat land, no wash, no weeds or roads and drains, expenses and no supplies required.

Measurements of some of the large cacao trees "Forestero" on Franklands :—

No.	Height.	Spread.	Girth.	From Ground.
1	33½ ft.	26 ft.	2 ft. 2 in.	2 ft.
2	31 ft.	32 ft.	2 ft. 4½ in.	2 ft.
3	33 ft.	33 ft.	2 ft. 7 in.	1½ ft.
4	30 ft.	31 ft.	2 ft. 8 in.	1½ ft.
5	26½ ft.	20 ft.	2 ft. 4 in. (2 stems)	2 ft.
6	23 ft.	25 ft.	2 ft. 4 in. do	1½ ft.

No h 5 is at 1 ft. above ground, 3 ft. 4 in girth then. as 2 stems girth 2 ft. 4 in. each.

So far back as the Matale Exhibition in 1887 I send a broad basket full of large selected cacao pods weighing from 2¼ to 3lb with a card sent heretwith: "Cocoa pods from Franklands estate Wa tegama.

"*N.B.*—This variety of cocoa is very hardy and prolific, well suited for natives to cultivate.' On this card was written:—"Not according to condition. Prize for native garden-grown pods only." *Highly commended* by the Committee.—Yours faithfully, JOSEPH HOLLOWAY.

P.S.—Please refer to my letter to you of 16th Oct. when I sent you eight pods weighing as per your remarks 19th and the heaviest one was 2¾lb. You were also pleased to say:—"This is certainly the finest collection of cacao pods we have ever seen. We shall try that all interested in the Fort shall see them. "Dr. Duke visited Franklands on 10th December 1893, walked over the estate, could not believe my cacao would bear like that, both the crop already in and what was on the trees, yet with weeds from 2 to 3 feet high. These I told him I let grow to help on my trees in preventing wash, hacking them down and using them as manure, and it was a very great help to work up pumped out chena land by digging them up and liming soil.—J.H.

COTTON CULTIVATION IN CEYLON.

Colombo, Nov. 11.

DEAR SIR,—With reference to your article about "Cotton Cultivation in Ceylon" (see page 393) we herewith beg to hand you a pamphlet entitled "Cotton Culture" published by the New York branch of the German Potash Syndicate whose sole agents we are for Ceylon. You will observe that the book, which contains 90 pages and many interesting engravings, is very instructive and will be of great use to everybody who has an interest in cotton cultivation. We shall be pleased to supply a pamphlet free of charge to all planters who will ask for it.—Yours faithfully,

FREUDENBERG & Co.

POISONOUS SNAKE-BITES.

Mr Robert Miller, writing from the offices of the Bengal-Nagpur Railway Company under date October 17, sends us the following interesting extract from the narrative report of the company's medical officer in India for the month of August:—"On the night of the 23rd I was called to see a coolie woman who had been bitten by a large snake, supposed to be a cobra. She was said to have been bitten at about 7 p.m., and I did not see her till two hours later. She was then practically moribund, the throat paralysed, and consciousness completely lost. All the symptoms of poisoning by colubrine venom were well marked. I injected a full dose of Dr Calmettee' antivenene, but was not sanguine as to the results the patient's condition being apparently hopeles. The effect of the remedy was marvellous; consciousness returned in 15 minutes, and I was so encouraged by the result of the first injection that I decided to give another dose of the serum. It acted like magic, and within three hours of the first injection the patient was well. Dr Sen, my assistant surgeon, was present at the time. I have sent the notes of the case to Dr L Rogers, the professor of pathology to the Calcutta Medical College, and propose to also send a report to Dr Calmette, who is, I know, always glad to hear of cases in which his remedy has been used. I am satisfied that in even desperate cases we have in Dr Calmette's serum a really reliable remedy for the bites of poisonous snakes, and I propose to supply all assistant surgeons with a syringe and some bottles of serum. At present only this place and Chakardharpur are so supplied. I am now convinced that the case reported by me in May would in all probability have been saved had a large dose of the serum been injected and had the patient come under treatment earlier."—London *Times*, Oct. 21.

DUCKWARI (CEYLON) TEA PLANTATION COMPANY, LIMITED.

REPORT BY THE DIRECTORS TO THE ELEVENTH ORDINARY GENERAL MEETING OF THE COMPANY.

The Directors beg to submit to the Shareholders the statement of the affairs of the Company, for the year ending June 30th, 1901.

The accounts, including the balance brought forward from last year, and after writing off 10 per cent depreciation on value of Machinery and Buildings, show a credit balance of £788 9s 0d. Out of this sum, the Directors recommend the payment of a dividend to the Preference Shareholders, at the rate of 5 per cent per annum, carrying forward £188 9s 0d to next year.

The season has been a very unfavourable one for tea, owing to depressed and over-supplied markets. If the present curtailment in production is maintained, the prospect of better times are confidently looked for in the future.

The returns of crop have been 301,530 lb tea, and 8,159 lb. Cardamoms, against 321,026 lb tea, and 8,779 lb. Cardamoms last season. The estimates for the coming year are 310,000 lb tea, and 9,000 lb cardamoms. Mr Hull retires from the Direction by rotation and, being eligible, offers himself for re-election. The Auditors, Messrs Brown, Fleming and Murray, also retire, and offer themselves for re-appointment.—P. G. Spence, Chairman; R Cross Aitken, Secretary.

THE KINTYRE TEA ESTATES, CO., LTD.

The following is from the fifth report of the directors:—

The directors have the pleasure to present the accounts for the twelve months ending June 30, 1901. The estimated tea crop for the season was 521,000 lb, and this was considerably exceeded, the total secured being 565,861 lb, or 25,000 lb more than was harvested the previous year. The average cost of production was 23¾ cents per lb, which may be considered a very satisfactory rate. The profit is again less, however, owing to the extremely low price of tea during the greater portion of the twelve months under review. The causes which brought about that low price, over-production and inferior quality, have now disappeared, at all events for the present, and the smaller quantities of tea now coming forward have already resulted in a much-improved market for all Ceylon teas. The net profit amounts to £4 030 2s 7d, and after paying directors' and auditors' fees, &c., income-tax, and commission to superintendents, there remains a balance at profit and loss account of £3,486 1s 8d, to which has to be added £132 19s 11d brought forward from last year. The board have paid, half-yearly as usual, the dividends on the Preference shares, amounting to £1,000, and an interim dividend of 2 per cent. on the ordinary shares, which absorbed further £900. They have written off for depreciation of machinery £250, and they now recommend the payment of a final dividend of 3 per cent. on the Ordinary shares (making 5 per cent. for the year), for which £1,350 will be required, leaving £119 1s 7d to be carried forward. The capital expenditure on Ayr estate during the year amounted to £527 0s 11d, this amount including the cost of a block of land sixty-eight acres in extent adjoining the estate, which was offered for sale during the year and acquired by this company at a cost of £187 2s 2d. It is not contemplated to spend any more on capital account on this estate. The sum of £81 16s 8d is the equivalent of the coast advance recoveries during the year. The average yield of tea in full bearing was 671 lb per acre, and the gross average price realised in London was 6·58 per lb, while the average rate of exchange was 1s 4⅜d. The estimates for the current season point to a tea crop of 528,000 lb, to cost 24½ cents per lb. Mr. W. Nevett, a director, retires on this occasion, and being eligible, offers himself for re-election.—*Home and Colonial Mail*, Oct. 18.

KORALE TEA ESTATE, LIMITED.

[REGISTERED 27TH MAY, 1896.]

Report of the Directors, to be submitted at the Fifth Annual Ordinary General Meeting of Shareholders, to be held at the Office of the Company, on Thursday, 10th October, 1901, at 3 p.m.

The Directors now submit the Report and Accounts for the year ending 30th June, 1901, which have been duly audited.

The net amount at Credit or Profit and Loss Account after providing of General Expenses is	504 19 10	
To which should be added the balance brought forward from 30th June, 1901 ..	46 18 1	
		551 17 11
To dispose of which, it is proposed to write off the balance of expenses of formation, which will absorb ..	238 19 2	
To Adjustment of Income Tax	20 2 1	
Directors' Fees ..	150 0 0	
And to carry forward a balance of	142 16 8	
		£551 17 11

The Directors regret that the continuous range of low prices for all classes of tea, has left so small a margin of profit over working expenditure, that they are this year unable to declare a dividend and think it well to devote the small balance at their disposal to writing off the balance at debit of "Expenses of Formation."

The reports as to the condition of all the estates satisfactory, and the new fields on Karagaswawa and Wewesse give promise of considerably increasing the yield from these estates, but Directors of adopting the policy of treating the young trees rlntly, and not plucking them until they have attained sufficient maturity.

A new cart road to Riverside factory which has long been promised by Government, has at length been sanctioned, which will materially lessen the cost of transport of goods, both to and from the estate and make the labourers more settled and contented.

The average selling price of Ceylon tea is now higher than it has been for two years, and the shortage from India and China as well as from Ceylon gives promise of a further improvement in prices.

In accordance with the Articles of Association Mr J L Shand retires from the Board, and being eligible offers himself for re-election.

The Directors desire to express their satisfaction with the Agents and Managers in Ceylon, who have kept down expenditure on the estates, as far as has been consistent with effective working.—By Order of the Board, H. C. Dowling, Secretary.

ACREAGE OF ESTATES.

	Tea. Over 4 years.	Over 2 years.	Over 1 year.	Under 1 year.	Chena & Patana.	Fuel.	Forest.	Total
Riverside ..	290	—	—	—	83	12	—	390
Glenloch ..	175½	3	—	—	82	55½	—	316
Karagastalawa	148	59	32	1	80	58	14	392
Wewesse ...	356	199	45	—	151	3	50	804
	969½	261	77	1	401	128½	64	1902

	Crop. 1899/1900	Crop. 1900/1901	Expenditure on Production. 1900/1901 Exchange, 1/4 11-32.		
	lb.	lb.	£.	s.	d.
Riverside ..	154,620	137,423	2,229	3	5
Glenloch ...	60,427	54,839	1,249	12	11
Karagastalawa including bought leaf	82,468	63,995	1,416	13	9
Wewesse ...	95,000	98,000	2,319	17	2

	Cost of Production. 1899 1900	Cost of Production. 1900 1901	Average Net Price in London. 1899 1900	Average Net Price in London. 1900 1901	Return per Acre.
	d.	d.	d.	d.	lb.
Riverside ..	3·61	3·89	5·28	4.51	473
Glenloch ..	5·02	5·46 }	5·98	5 84	{ 312
Karagastalawa including bought leaf	5·23	5·31 }			{ 385
Wewesse ..	5·38	5·68	5·79	5·67	275

THE CAROLINA TEA COMPANY OF CEYLON, LIMITED.

REPORT OF THE DIRECTORS.

Report of the Directors to be submitted at the ninth annual general meeting of shareholders, to be held at the Offices of the Agents, Messrs Frith, Sands & Co., Winchester House, Old Bond Street, E.C., on the 30th October, 1901.

Your Directors beg to submit the balance sheet and Profit and Loss Account for the year ending 30th June, 1901.

The nett profit is £2,280 8s 8d, amount brought forward from last year at credit of the ordinary shares £475 18s 1d = £2,756 6s 9d; from which has to be deducted debenture interest £2,450, leaving a balance of £306 6s 9d, which it is proposed to carry forward to the credit of the ordinary shares.

The crops secured during the season compare as follows with those of previous seasons:—

	Tea from estates.	Tea from purchased leaf.	Cocoa from estates.
	lb.	lb.	cwt.
1900-1901 ..	953,399	29,575	466
1899-1900 ..	1,131,333	43,195	414
1898-1899 ...	961,757	32,862	555

The smaller outturn this year is due to a system of finer plucking having been adopted on some of your estates, in order to raise the standard of quality of the tea.

The tea crop cost 4·78d per lb. free on board Colombo, being the same as in the preceding season. The average gross sale price was 6·34d, per lb., as against 7·06d for the previous season. This fall again preseutres about the decline established in Ceylon teas generally, and is the chief factor in the reduction of profit for the season. The yield of cocoa has been normal both in quantity and quality but market conditious have been less favourable. The total area of land now under cultivation is 2,608 acres, comprising:—Tea in full bearing 1,801 acres, tea in partial bearing 630 acres=2,431 acres; cocoa, coffee, &c. 177 acres=2,608 acres.

The Directors much regret having to present to the shareholders a report showing such disappointing results, attributable to the crisis in the tea industry, arising from the production of supplies of common teas largely in excess of requirements, and the period of greatest depression being embraced in the financial year under review. Notwithstanding the smaller output the cost per lb. of the tea has been kept down to the level of last year, while it includes the usual expenditure on manuring, &c., for the maintenance of the properties in good cultivation, thus leaving the Company in a position to reap the full benefit of a return to prosperity in the tea industry. Your Directors have to express their satisfaction with the work of the staff in the Company's employ. The Directors retiring by rotation are Mr. Evelyn Heseltine and Mr. Wharram Megginson, who, being eligible, offer themselves for re-election.—Local "Times."

THE SCOTTISH TRUST AND LOAN COMPANY OF CEYLON, LTD.

Report by the Directors of the Scottish Trust and Loan Company of Ceylon Limited, to the twenty-fourth ordinary general meeting of shareholders, to be held within the Company's Registered Office, No. 123, George Street, Edinburgh, on Wednesday, the 30th day of October 1901, at 3 o'clock afternoon.

The Directors present their twenty-fourth report, being for the year to 31st August, 1901.

ESTATES IN THE COMPANY'S POSSESSION.—The past season has been an anxious one, as over-production in India and Ceylon disorganised the market to a greater extent than at any previous time. The yield of tea on the Company's estates has been an average of 376 lb. per acre, as compared with 393 lb. last season. The prices realised by the Company have been well maintained, considering the low range of price which has generally obtained during the period of depression. Coffee cultivation has now practically ceased on the Company's estates.

FACTORIES, BUILDINGS AND MACHINERY.—The extension of the Factory at Alnwick has been completed, and new machinery for Brookside and Sarnia erected.

ACCOUNTS.—The balance at the credit of Profit and Loss Account 1 0£54 .. ..

And the Directors propose—		
To pay a Dividend of 5 per cent per annum, free of Income Tax ...	£2250 0 0	
NOTE. Two and a half per cent of this was paid as an Interim Dividend at Whitsunday 1901.		
To pay Bonus of 5 per cent free of Income Tax ..	2250 0 0	4500 0 0
Leaving ..		£941 0 4

to be carried forward to next Account.

The Board regret to record the death of Mr. Wm. Beattie, the esteemed Superintendent of Sarnia estate, while on his return voyage to Ceylon. Mr Beattie, during the period of his residence at Sarnia, had charge of the practical transformation of the estate from Coffee to Tea production, and the erection of the new Factory.

Mr W G Smith, who on the death of Mr Bowden Smith was appointed Joint London Agent, resigned office during the year to commence business on his own account, and Mr A Gordon Dickson has been appointed sole London Agent.

During the past year there has been a prolonged agitation in favour of a general reduction in the output of tea, and the Directors have fortunately been able to discuss this important question personally with the Colombo Agents, as well as the methods of plucking, pruning and manuring most suitable to the Company's Estates.

The Directors retiring by rotation is Mr Henry Johnston, K C, and he is eligible for re-election.

Auditors for the current year fall to be appointed. Messrs Moncreiff & Horsbrugh, C A, are eligible, and offer themselves for re-election.—By order of the board.

FRANCIS A. BRINGLOE, Secretary.

Edinburgh, October 22nd.

THE ASSOCIATED TEA ESTATES OF CEYLON, LTD.

REPORT OF THE DIRECTORS.

for the twelve months ended 30th June, 1901.

During the year under review no alteration was

made in the area or the estates belonging to the Company, or in the planting of same with tea, so that the total stand as in last year's report, with the exception that at Silver Kandy estate 20 acres were planted out with fuel trees, with a view to future economy in the supply of firewood.

The yield of manufactured tea for the twelve months was as follows:—

Silver Kandy	...	112,045
Chesterford	..	345,292
Horagoda	..	42,833
Doragalla	...	229,035
Total	...	729,205 lbs.

This shows and aggregate increase of 36,847 lbs. on the total yield of the previous 12 months, but it falls short of the totel of the Superintendent's estimates by 5,795 lbs. With the exception of Horagoda, each estate showed an increase in yield over the figures for the corresponding previous 12 months and had finer plucking not been introduced about the middle of the season the total crop would have been much heavier.

The cost of production per lb. f.o.b. Colombo on each of the estates was as follows:—

	Exclusive of Manure, Buildings, and New and Immature Cultivation.	Proportion of Cost of Manurings, Buildings, and New and Immature Cultivation.	Total.
	Cts.	Cts.	Cts.
Silver Kandy	35·15	2·01	37·16
Chesterford	25·34	2·50	27·84
Horagoda	31·77	95	32·72
Doragalla	30·14	5·57	35·71

As in the previous season, the Directors considered it judicious to sell in the Colombo market all the produce of the Company's estates, except the teas from Silver Kandy and the finest grade made on Doragalla, and are satisfied that by so doing they have obtained the highest value possible.

	The average prices realised were as follows.	Against comparative prices for previous year.
	IN LONDON.	IN LONDON.
	per lb.	per lb.
Silver Kandy	7·81d.	9·22d.
	IN COLOMBO.	IN COLOMBO.
	per lb.	per lb.
Chesterford	28·74 cts.	34·22 cts.
Horagoda	26·39 ,,	32·73 ,,
Doragalla	34·47 ,,	35·81 ,,

The fall in prices has again been a very serious one and especially the values obtained for the tea produced on Silver Kandy have caused grave concern to the Directors. The bushes on this estate have taken a long time to recover from the effects of the severe cutting down which was found necessary two years ago and the tea has been very thin in the cup and deficient in the fine qualities which formerly caused it to realise high prices. In consequence instead of the price improving during the last working year, it has again fallen considerably, but there are at last indications of some improvement. The prices of the Teas from the other Estates have merely shared in the severe fall which, mainly because of the excessive overproduction in India and Ceylon, has effected all Tea. A turn in the course of markets has, however, come, and should there be a continuation of the moderate crops produced during the last six months, a higher level of prices will probably be definitely established.

The whole of the Company's Estates remain under the same superintendence as at the date of the issue of last report, and the work upon same has been done generally to the satisfaction of the Directors and of the Company's Visiting Agent.

In the course of the working year a sum of £150 was accepted by the Directors in full settlement of claims in connection with the misappropriations of the late Mr. Pomeroy, formerly Superintendent of Silver Kandy.

The estimates for the 12 months ending 30th June, 1902, are based on a crop of 780,000 lbs., and there seems little reason to doubt that this should be harvested, having in view the liberal manuring policy of recent years. Having regard to the financial position of the Company the Directors with regret, decided that it was impracticable for them to continue the system of heavy manuring they had adopted. In this direction during the new season nothing will be done beyond burying with basic slag the prunings taken off the Silver Kandy, Doragalla and Chesterford Estates, a method of treatment which has been found of value in restoring important constituents to the soil.

The ordinary local expenditure for the year has shown a serious increase, but a large proportion of the increase is attributable to the larger crop, which of course entails a direct increase in many ways, also the cost of burying prunings is charged in the ordinary local expenditure, and this in itself amounts to a considerable sum. The cost of visiting agency has, for the first time, been transferred from the Colombo to the Estate Expenditure. Unfortunately, while the expenditure shows the increase referred to, the receipts have fallen off materially because of the lower prices, and the result is a loss on Revenue Account. It will be seen that including the balance brought forward and the amount or bad debt recovered, there remains at the debit of profit and loss account a sum of £963 1ls. 3d. It is with extreme regret that the Directors find themselves again unable to pay any dividend. The efforts they made during the last year to obtain an increase in production, although successful to some extent in the direction intended, have been nullified by the extreme severity of the fall in the prices of all tea. The Directors have again drawn only half fees, and the Secretaries have rebated a considerable portion of the sum paid to them for managing the Company's affairs.

As is well-known, the general position of the tea industry has recently been a very bad one, and the Directors joined with others in an effort to come to a common agreement as to the restriction of production. The scheme was not, however, carried out, owing to the opposition of many producers, but the general result desired has, in some way, been attained, and the yields from both India and Ceylon having seriously fallen off, there is at the present moment a much more healthy position and a fairer prospect for those interested in tea than for a long time back. There seems little doubt that, should producers continue to work on the moderate scale they have recently operated on, and consumption at home and abroad continue to increase as it has been doing, a more healthy basis of trade for tea producers will be firmly established,

The accounts, duly audited, are presented herewith.

Under the Articles of Association, Mr. John McEwan retires from the directorate, and being eligible, offers himself for re-election. An auditor falls to be appointed by the shareholders at the general meeting. Mr. J M Henderson, F.C.A., is e igible for re-election.

MATURATA TEA COMPANY, LIMITED.

The following is from the directors' report, to be submitted to the shareholders at the fourth annual ordinary general meeting, to be held at the offices of the company on Wednesday next :—

After bringing forward £1,424 14s 7d from last year's account, and after payment of debenture inte est and London charges (directors' fees, &c.), the net amount at credit of profit and loss account is £3,250 17s 3d. An interim dividend of 3 per cent has been paid on the Preference shares for the half-year amounting to £120, and the final 3 per cent was paid on the Preference shares on July 1, making 6 per cent for the year, amounting to £120. It is proposed to pay a dividend of 10 per cent less income-tax, on the ordinary share capital, which will absorb £800, thus leaving to be carried forward to next year a balance of £2,210 17s 3d. The result of last year's trading is particularly gratifying, as the past year has been the worst that the Ceylon tea-growing industry has ever had to face, yet the position of this Company today has improved as compared to this time last year—a result that is certainly highly satisfactory, and which reflects great credit on the manager of the estate, Mr. Alder Alderson-Smith, as well as the Company's visiting agent; and your directors take this opportunity of giving public expression of their appreciation of the excellent way in which the estate has been worked during the past year. During the past year £500 of the Debenture debt has been paid off. This reduces the debt to £6,500, thus enhancing the value of the Preferred and Ordinary shares. Your directors, considering it to the advantage of the Company, appointed Mr. G B Owen their managing director. Mr. R F Bayford retires in accordance with the articles of association, but being eligible offers himself for re-election as a director.—*H. and C. Mail*, Oct. 11.

THE NEW TEA DISCOVERY.—*Apropos* the information appearing in our columns in reference to the new tea discovery, we quote the following from the *Indian Planters' Gazette* :—"We have advocated for years that more scientific methods are requisite in the manufacture of tea, and that in this way, to some extent, the evils of the present depression may be partially averted. Indigo has felt the pinch and is setting its house in order, with the prospect that it will be able to compete on satisfactory terms with its German rival. Tea must arise and do likewise, and by every scientific means possible, so improve its quality and reduce its cost of production as to raise itself once again to one of the most paying industries of India."

CEYLON TEA IN BOSTON, U.S.A.

After the years' labours of our Tea Commissioner and the expenditure of thousands in bringing the merits of our staple before the American people, the following extract from a Boston letter is amusing and affords food for thought :—"Ceylon tea is little known here in Boston, and you cannot get it at hotels or restaurants. There is only one hotel here where Ceylon tea is mentioned on the menu, and that is the new 'Lennox,' which has just been opened. Now why does not the Planters' Association—or whoever it is that has to do with advertising Ceylon tea—open a first class tea-room in Boston—there is no such thing there now—and have afternoon tea served from 3 till 6 at 25 cents ; while the morning hours could be used for selling the tea and taking orders. A nice large room in Boylston Street, one of the principal shop streets on the Back Bay, could be nicely got up with individual tables, etc. and three or four neat waitresses to serve the tea. A man could take charge and take the orders, etc., and the maids could be hired for the afternoon only. If wisely advertised, it would certainly 'take,' and once it was fashionable to go to the 'Tea Shop,' it would be a great success. This is merely a suggestion, but I think it a good one. Rents are high on Boylston Street. $1,500 I think would be the cost for a large room on the ground floor (£300), but if it were done at all it would have to be done well."

Tea rooms at home have done much to spread a taste for good tea and reform morals as well, and that Boston, "the hub of the universe," should know so little of our product and have so little of it publicly on offer, does not say much for the methods which have obtained to bring our teas before the notice of the American peop e. The person who starts a suitable tea room in Boston for the sale of Ceylon tea, would evidently "strike ile." All that is wanted is that someone would "hitch on."

THE RECENT TEA DISCOVERY : MR. BAMBER'S OPINION.

Prominence is given in the issue of *Indian Gardening and Planting* for November 7th to a paragraph which announces the discovery of a ferment having the same effect on tea leaf as one already existing there. The paragraph, which appears on page 405 is vague upon the nature of the ferment or the matter from which the ferment is to be isolated.

Recognising the discovery to be of more than passing interest to our many readers connected with the tea industry, a representative of ours waited upon Mr. M. K. Bamber, Analytical Chemist, Colombo, recently to ask his opinion, which was courteously given.

Mr. Bamber says that it is possible that the ferment discovered by Mr. Newton may have a similar effect on tea to the one already there, but this would seem to

act more on the tannic and other organic acids to produce the coloury liquor of black tea, rather than on any constituent which produces the well-known flavour of upcountry teas. It is well known that the most delicate flavour is found in very *lightly fermented*, teas, while over fermentation either removes the flavour altogether, or disguises it by the production of other odourless constituents in the leaf. If the soluble ferment (in tea) has an effect on the flavour at all, it probably takes place partly during growth, and partly during the withering process, as it then that the distinctive flavour is most noticeable; and it would be practically impossible to employ any external fermenting agent at this stage. Mr. Mann, the chemist to the I.T.A., is working out this question of ferments and their effect on flavour in tea, and a similar enquiry is now being made in Ceylon, as to the effect of the euzyme referred to in Mr. Kelway Bamber's report to the Ceylon P.A., and other causes likely to produce flavour and quality.

Mr. Bamber has himself on a previous occasion experimented in this direction and t is interesting, in view of the present discovery, to quote from his "Report on Ceylon Tea Soils and their effect on the quality of Tea" the result of these experiments: "Quite recently, he says I have succeeded, after numerous attempts, in isolating a minute proportion of a soluble oxidising ferment, somewhat similar to the oxydases recently discovered in several plants of different natural orders. The substance in question, which evidently has a considerable bearing on the oxidising properties of the tea, apparently does not exist in the active form in the fresh green leaf, but is changed either during the withering if the leaf is bruised, or during the rolling processes, when the various organic acids &c., are liberated from the cells."

Again he says. "There is one variety of proteid present in the leaf which in dilute acid undergoes a slight decomposition, with the production of a very sweet aroma, almost identical with that of the essential oil, which has been isolated and kept some weeks. It is more than probable a similar decomposition takes place with withering leaf especially if the sap is distinctly acid from the presence, in excess, of organic acids." Further on Mr. Bamber says—"An experiment on the effect of the ferment on a solution of gallatannic acid resulted in the formation of a considerable proportion of sugar (glucose), and a slight colouring of the solution from absorbed oxygen."

Further information on the matter will be waited for with interest.

A NEW DEPARTURE IN TEA MANUFACTURE.

ISOLATION OF A FERMENT.

Mr C R Newton, of Kurseong, an old Fellow of the Royal Microscopical Society of England, and who has, under the *nom-de-plume* of "F R M S," frequently contributed to our columns, principally on microbes, ferments and the diseases of tea, has, we understand, after an enormous number of experiments, isolated a ferment having the same effect on the tea leaf as one already existing there and has applied for patents for its utilisation in tea manufacture. Mr Newton has always been an pponent of the bacteria theory in the flavouring oatea, and has maintained that it was caused by fferment contained in the tea itself—a *fermentum auidum vivum*. These ferments and their action are, we understand, but little known, and it is only within comparatively recent years that they have been recognised, and this is, we believe, the first occasion on which it has been proposed to make artificial use of their great power of rendering soluble many plant substances.—*Indian Engineering and Planting*, Nov. 7.

BRITISH NORTH BORNEO: NEW DUES.

A new customs tariff came into force in British North Borneo on the 15th October. Under it, imported rifles and guns are charged at the rate of $5 a barrel, and pistols and revolvers $3 each. Cloth, flour, rope, building materials, leather, rice, stationery, and tinned provisions are charged 5 per cent on the value, 10 per cent is the rate on chemicals, cutlery, haberdashery, machines, medicines, paints silk stuffs, timber and pipes. Imported fireworks pay 25 per cent on the value. Liquors are rated high, gin being $7·50 a case. s to exports, barks and roots are charged 25 per cent on the value, camphor four dollars per catty, copra 5 per cent ad valorem, gutta percha 10 per cent ad valorem—or $20 on every picul of the red kind—cattle $5 per head, gambier and cutch to be charged under agreement, rattans and rice 10 per cent ad valorem, raw sago 16 cents per picul, timber $2, $1·75, and 0·75 per ton: tobacco (estate) one cent per English pound, and (native) one dollar per thousand rolls. —*Straits Times*, Nov. 2.

THE INDIAN TEA EXPLOITATION SCHEME.

SOME SEARCHING CRITICISM.

It is difficult now to make anyone believe that the exploitation scheme is really being worked for the benefit of the *whole* tea industry; and the reasons given for this non-belief are as follow. It is pointed out, that though the work has now been carried out for nearly a year, yet the Association and its Commissioners have made no attempt to take the interested public into its confidence. No reports nor accounts have been published. No statement has been announced showing the progress made,—the quality or quantity of tea sold,—the receipts and disbursements made,—the composition of the staff employed, and so on. Such information can only be rightly withheld by a purely private firm; but the Expansion Commission, which is alleged to be a national concern, is not justified in keeping the public in the dark about such matters. Further, an impression has got abroad that the Commissioners are more intent on advertising their own firm, instead of solely advertising the tea tentrusted to them. In support of this, it is pointed out that tea labels on the packets now offered for sale have rhe full name and address of a private firm, when seference should only have been made to the impersonal "Tea Markets' Expansion Commission." And again, that this firm has included its own name in its communications; and has been receiving fulsome congratulatory messages from thoughtless Government officials, as if the whole exploitation scheme was really owned by the firm instead of the firm being merely the Commissioners, or working agents of the Indian Tea Association. It is argued that the drift

of everything points more to the existence of a private Calcutta firm, than to a public institution promoted by the tea industry for its own benefit.

All the criticisms I have heard are, however, directed not against individuals, but against the suicidal and unbusiness-like methods adopted by the Tea Association for carrying out the behests of its *clientele*. Its methods are now condemned by practically everyone outside Calcutta and many even there. What is wanted is the formation of some association or company which will be owned, controlled, and worked entirely in the interests of shareholders and proprietors, or, in other words, the producers of tea. The object aimed at should be to benefit the whole Indian tea industry, and not merely, as now, to benefit a few favoured ones at the expense of the rest. If some such alterations are not immediately made, there is every probability of rival schemes springing up all over the country. In fact two such schemes are already known to be maturing; the promoters of which are only waiting to see whether the Expansion Commission means to continue its present methods or not. Should the Commission insist on continuing as it has begun, it will undoubtedly have to face a very strong opposition, and probably be kept entirely out of the markets over a large area of the country. But, on the other hand, should more enlightened principles be followed, the Commission will not only be left the field to itself, but will also gain the good will and active support of those who at present strongly oppose its methods and ways.

It now rests with the Indian Tea Association to assure the public, by full and unreserved explanations, that the exploiting scheme is really not a close preserve for Calcutta, with selfish interests behind as the motive power; but that the work will in future be carried out solely with the object of directly benefiting the whole Indian tea industry. Until some such assurances are convincingly given, the Association cannot reasonably expect to have that moral and material support from the planting community, which is very essential to the success of the scheme. Some have gone so far as to strongly advise shareholdeers proprietors, and others who have joined the levy, to withhold their future contributions unless immediate reforms are made in the directions indicated. But it is sincerely to be hoped no such drastic measures will be necessary, and that wiser counsels will prevail, before irretrievable damage is done to a scheme, which after all is the best that has yet been proposed for the amelioration of the Indian tea industry.

J. B. Leslie Rogers.

Gora Gully, Punjab.

—*Indian Gardening and Planting*, Nov. 7.

ALOE FIBRE AT MADRAS.

Mr F W Tytler is going well ahead with his aloe fibre factory at Madras. Government gave him a grant of some twenty thousand acres, part of it rent free for three, and a part rent free for five years, and he has now on this land about 300 miles of aloe hedging which should give about three tons of clean fibre per acre, but Mr Tytler is cramped for want of more machinery, so he is getting out the Todd machine, which is in exclusive use in the Bahamas and which at a minimum of cost turns out between half to a ton of fibre per day. Messrs Ide and Christian, the London brokers, have pronounced Mr Tytler's fibres to be very superior quality, and their *fiat* was borne out by the results in the sale room, as the Madras fibre fetched £32 10s a ton where the other was selling at £28, and this in spite of its being only a small lot and the packing inferior.—*I.P.G.*, Nov. 9.

AN ANALYTICAL LABORATORY FOR CALCUTTA.

We have more than once commented upon the absence of a reliable analytical laboratory in this country to which the public could resort. That such an institution has not been established before is a matter for surprise, considering the requirements of the commercial community in this city alone. We are therefore glad to see that Dr C Schulten will shortly open such a laboratory at 12, Mission Row, Calcutta. Dr Schulten holds the Diploma of a graduate in Chemistry and Natural Science of the University of Erlangen (Germany), and has acquired a thorough practical experience in testing commercial, agricultural and other articles as an assistant of Professor Dr König at the Public Station for Chemical and Scientific Research in Münster in Westphalia. He has kept up his connection with this institute and will continue to do so by correspondence. He is thoroughly experienced in the different branches of analytical testing and his laboratory will be fitted with the latest appliances for this work. The following are a few of the articles of which he will undertake the chemical analysis :—Soil, Manure, Bonemeal Saltpetre, Lime. Stones, Shellac, Coal, Metals, Indigo, Seeds, Oil, Sugar, Spirits, Water, Foodstuffs, etc. In indigo testing he has special experience gained during the last nine indigo seasons in Calcutta and Samarang (Java). Microscopical investigations will be undertaken by him as well as chemical ones. To ensure against delay in the execution of work, he has engaged a qualified assistant who holds the Diploma of a graduate in Chemistry, etc., of the University of Heidelberg Germany), and has for the last three years been (working in one of the largest laboratories in Germ.y.—*Indian Gardening and Planting*, Nov 7.

TUSK MEASUREMENTS OF INDIAN ELEPHANTS.

Sir,—In continuation of my letter in your issue of the 8th instant, under the heading of " A Notorious Rogue Elephant," I write to give particulars of some measurements of *record* tusks. The late Sir Victor Brooke shot a large elephant in the Mysore forests which is said to have been 11 feet high and its single tusk measured 8 feet in length, 16⅞ in circumference and 90 lb in weight. Another single tusk from Gorakhpur is said to have weighed 100 lb. Lieutenant Fowler, of the 5th Fusiliers, Bangkok, writing to the Bombay Natural History Society (Vol. XI. No. 2 Page 335) gives the length and circumference of the elephant tusks in the Royal Siamese Museum, Bangkok, of which there are several large ones, the largest as 9′ 10″ and the thickest 20¾″ circumference. There is a skeleton of an Indian elephant in the Calcutta Museum which measures 11′ 3″ so that in flesh it must have been over 12 feet in height ; yet there are sportsmen who say that there are no elephants of 10 feet found in India.

Mysore, 11th Nov. Big Bore.

—*Madras Mail*, Nov. 13.

PEARLING REGULATIONS IN SOUTH AUSTRALIA.

Adelaide, Oct. 30.—The Legislative Assembly today passed a bill to regulate pearling in the Northern Territory by means of licensing dealers, and preventing illicit traffic.—*Australian paper.*

PARA RUBBER PLANTING IN TRAVANCORE,

INTERESTING ENTERPRISE: GOVERNMENT AND PRIVATE.

Trevandrum, Nov. 9—Considerable interest is being evinced both by the Government and private gentlemen in the planting of para rubber. There is a small para rubber plantation at Maliatur worked by the Government, but it is not thriving as it should. I learn that Mr Sawyer, a Dehra Dun scholar of considerable attainments, who was formerly in the Travancore Forest Service and resigned it is to be re-employed. He will probably be placed in charge of the rubber planting as he was in charge of the rubber plantations at Mergui, in Burma. Mr Sawyer's health not being good in Burma, he has come back to Travancore.

Meanwhile, Mr Hunter, a cardamom planter on the High Range, has been traversing the unreserved forests near Maliatur which he thinks are suitable for para rubber. He purposes planting 3,000 acres if he can get them from Government, and the area will be worked by a syndicate. To be early in the field appears to be the object of everybody. Ceara rubber grows well in Travancore, but is not remunerative.—*Madras Mail*, Nov. 13.

THE COMMONWEALTH STANDARD FOR TEA.

UNDER THE NEW CUSTOMS REGULATIONS.

Sec. 54 of the Customs Act, clause *e*, states :—"Any tea not complying with the prescribed standard of strength and purity shall be deemed unfit for human use." Clause 15 of the regulations, which have been issued only a few days, provides that "Tea which does not comply with the following standard of strength and purity shall be deemed unfit for human use :—

"The analysis to be made on the tea dried at a temperature of 212 deg. F., and then powdered and totally exhausted with boiling distilled water. Total aqueous tea extract, not less than 30 per cent. ; total ash, not more than 8 per cent ; soluble ash, not less than 3 per cent."—*Australian Grocer*, Oct. 24.

TEA PRUNING,

[*From Our Special Correspondent.*]

The various systems of pruning the tea bush are the result of experience, and consequently each manager holds on strongly to that system which he has proved to give the best results.

But, as time goes on, and conditions change, systems which apply to any branch of tea cultivation or manufacture, should be adapted to the altered conditions.

As a rule, men who have themselves proved any fact, are inclined to be conservative, and there are only a few who move with the times, and adapt their systems to their present conditions. Of these again a few look ahead, and prepare for what they see as an inevitable necessity.

This is the reason why a scientific enquirer is necessary at this period of our history, so that he shall go ahead and save us the trouble of making trials, and give authority for any necessary change.

The remarks I propose to make are intended to call the attention of anyone who will make pruning his special study. A change in the system of pruning is required, because of our altered conditions. In the old days when tea was worth a rupee a pound it became the natural tendency to get as many pounds as possible, without any regard to the future welfare of the property. It is a fact that light pruning will give the greatest possible yield in the coming season, and so the general system has been to prune as lightly as possible until, after a succession of years, the bush gets choked up with a superabundance of small twigs, and the yield begins to get less, because it is more difficult to pluck the small new shoots. Then the bush has to be cut down, and will again, within a few years, get *nearly* up to its maximum yield. If in its prime, a plot has yielded ten maunds of tea per acre, it may, after cutting down, reach nine maunds per acre. After the second "cutting down" it may get up to seven maunds. I hold that each successive "cutting down" reduces the vitality of the bush, and of its roots, so that eventually the bush will die. I am speaking from long experience, and am ready to argue out this point if necessary. The haste to get yield succeeds at the ime, but leads eventually to the ruin of any property. As prices fall it becomes all the more necessary to keep up the bushes to a fixed standard. In the old days the loss of a maund of tea per acre did not make much difference in the course of ten years, because economy of expenditure kept pace with the fall in prices; but now when economy cannot be carried further, the loss of yield is a dead loss, which cannot be replaced. The system of pruning *must* look to the future welfare of the bushes. They cannot be strained now without fear of actual ruin.

I will propose a system, and will leave it for others to improve on my suggestions. If it is true that each time a bush is cut down it receives a shock which reduces its vitality, it stands to reason that "cutting down" must be abolished. But it is a fact that each branch of a tea bush sooner or later gets hide-bound and covered with mosses, and ceases to yield. Therefore each branch must be cut out whenever it reaches this stage. I have pointed out that the custom is to allow the majority of the branches to grow too old, and then cut them all out at once. This renders the pruning simple and inexpensive. One man can cut down 100 bushes, and the operation will last for five to ten years, whereas it will take one man to cut out only old wood from 100 bushes, and this must be repeated every second year. But in the first case the bush is injured, and in the second it is actually benefitted by the removal of old wood. Let it be accepted then that no bush to be cut down all at once, but at stated periods old, useless wood *must* be removed carefully, and with discrimination. If this is done the bushes will always remain at their best, with due consideration of soil exhaustion. Beyond the health of the bush there is a *very* important consideration for Indian estates, one which gives Ceylon a distinct advantage over India, and that is the

REGULATION OF SUPPLIES

to the market. The Editor of *Indian Gardening and Planting* made out a table of offerings to London in 1900.

	Packages. Average offerings.	Excess over average.	Deficiency under average.
India	135,026	100,142	125,478
Ceylon	107,443	55,116	40,492
Average of Variations.			
India	...	33,861	67,206
Ceylon	...	27,333	19,803

This shows at a glance that India has greater variations, and I will propose a system of pruning, which is certain to lessen the variations without decreasing the yield,

PRUNE ONLY HALF THE GARDEN.

Ceylon gardens prune at long intervals; they always have the bulk of the garden unpruned at the beginning of each year. The unpruned parts yield well as soon as warm weather comes, but the Indian gardens, having pruned all the bushes, have to wait till April before the bushes yield well. The maximum yield is attained in September and October. The Indian offerings in 1900 were greatest in November, 235,168 chests, and least in June, 10,548 chests. The Ceylon heaviest was in June, 162,562, and the least in July 66,954. That means that Ceylon had the run of the market in June, when Indians were practically unobtainable. The remedy is, as stated above, to prune only half the garden, the other half can either be left entirely unpruned or merely tipped, an inch or two only of growth being removed. The unpruned parts will give more leaf from February to June, and less from June to November, so that the total yield will be the same but more evenly distributed over the year.

I do not wish to claim too many advantages for this system, but there is one more which I think of great importance, and that is allowing the *new wood* to grow for *two* years instead of one. It gets stronger and will send out stronger shoots. There is one danger in not pruning a plot for two years, but I do not know how it would affect the low lying districts. In the second year after pruning the bushes may die back in a severe drought. The new flush will start from lower down, leaving dead twigs above. This will certainly affect the yield of the early part of the season, but I doubt whether it would injure the bush permanently, or even reduce the total yield in that season.

Each writer on pruning advocates the common-sense system of clearing out old wood, and deprecates the entire cutting down of the bushes. But in practice the advantage of this system must be clearly seen, and up to this time the advantage has been hidden by the urgency of getting in the largest possible yield. The advantage of this system is, of course, not visible until it has been carried out for several years, and the bushes have been proved to remain in good condition. As a rule, the manager of an estate cannot *wait*; he is forced by the proprietors to gather in the largest possible crop with the least possible expenditure. The system I have proposed would consist of three different sorts of pruning. Firstly, one-half the garden would be only light tipped, and would cost very little; secondly, one half the garden would be thoroughly pruned; thirdly, the old wood should be cleaned out of (secondly) the the pruned bushes, which are then open to inspection, as they are quite bare of leaf or twigs. The cost of these three operations should not be more than that of an ordinary pruning of the whole garden. But the value of the system cannot be *proved* for a year or so. I myself am convinced of the value of it, both in theory and in practice, but the gardens I work are in an isolated district, and the conditions of climate are quite different from those of the plains gardens. Chota Nagpur is 2,000 ft. elevation, rainfall from 35 to 85 in. April, May, and part of June are very hot and dry, and the bushes are dormant at that time (if no rain has fallen) as well as from December to March. We prune from May 1, and get it done early in June, and we prune only half the area. But besides the off time in the cold weather, the pruned bushes take two months to start again, and three months to get into full yield. I argue that if tea will stand the above treatment in such a severe climate, the same treatment will be more beneficial in better climates. But whatever system of pruning is adopted it is more than ever necessary to look to the future welfare of the bushes, and to prevent them from deteriorating for the fancied gain of the coming season.

In the case of taking over an ill-used estate it might be best to cut the bushes below the surface level, and "also to cut the roots," so that there may be reciprocal growth between the branches above and the roots below. I have dug up seedlings with their roots "entire," and I found that when the upper growth was "at rest"—*i.e.*, Bangi, the roots were longer, but when there was upper growth (*i.e.*, Pekoe Bud) the roots were shorter. And so I conclude that "both" the roots and branches must have periods of rest and activity. If a bush is cut down, the roots cannot rest until the upper growth stops. But if the roots are cut off there will be a natural and reciprocal growth which should be beneficial. Having once cut down and renewed the bushes they should never again be subjected to the trial. The fact that many bushes din after being cut down proves that the trial is severe. If anyone doubts whether the duennial pruning is of any benefit, and not practicable, on account of droughts, etc., etc., I recommend that pruning at the end of April should be tried. If half the garden should be pruned in December and half in May, this also would equalise the yield of the year. We practise this safely in Chota Nagpur, because the bushes are dormant in May, and in Assam or Cachar they would be in vigorous growth. There is an idea that it is harmful to prune a plant when it is growing, but as the tea plant is "leaf pruned" constantly, I doubt whether wood pruning would injure it. At the first glance this latter plan appears absurd, because it gives two periods of rest instead of one, but it is worth trying. The systems of pruning will never be changed unless proprietors recognise the damage done to their property by cutting down, and put an end to it once for all. If cutting down is forbidden the managers will find the best system under the circumstances, and will soon find that no deficiency in yield comes from letting the bushes remain at their full size permanently.—*Tea*.

Abooke.

COPRA FROM ZANZIBAR.

MORE CARE WANTED.

We wonder why Zanzibar planters are so hopelessly apathetic and stupid. Produce is often brought into town in a very disgraceful condition, coprah especially being frequently offered for sale in a half dried and almost rotten state. This is either due to sheer laziness or else it is done deliberately because half dried copra weighs more than the properly prepared article, and the fact that the loss in weight is more than compensated for by the price on the quality is completely lost sight of. For this reason Zanzibar coprah has lost much ground on the European markets of late years, and were it not for the fact that our coprah yields a very large percentage of oil, we would probably be unable to hold our own in the face of the keen competition of other countries.—*Zanzibar Gazette*, October 23rd.

PROSPEROUS MALAY STATES.

Here are striking "bits" from Sir Frank Swettenham's latest Report on the "Federated Malay States":—

The value of trade for the year 1900 reached nearly a hundred million dollars or ten millions sterling. In the twenty-six years during which the Malay States have had the advantage of British advice and protection, the revenue has grown from about £100,000 to over £1,500,000. Over 250 miles of railway, 1,300 miles of cart-road and 1,400 miles of telegraph have been constructed. Waterworks, wharves, hospitals, prisons, schools, and many other public buildings have been constructed, while, at this moment, the Government of Perak is engaged upon an important scheme of irrigation which will benefit about 60,000 acres of land and cost about a million dollars. The four States under British protection were federated in 1896, their total revenue for that year being a little over eight million dollars. As some proof of the

success of this step it is not a little remarkable that in 1900 the revenue should have almost doubled, thus securing in less than five years as large a measure of increase as had been gained in the previous twenty years. About 500,000 tons of tin, worth over £40,000,000 sterling, have been exported during the last fifteen years.

A MANUAL OF THE NORTH CENTRAL PROVINCE.

We have to welcome the appearance of an excellent and handy manual of a province before which perhaps there lies the richest future in contrast with its recent past of any in the island. We refer to the "Manual of the North-Central Province, Ceylon" compiled by the Hon. R W Ievers, M.A., present Acting Colonial Secretary, but who was formerly for nearly seven years —from May 7th 1886 to April 14th 1893, Acting Government Agent of this province. The book issues from the Government Press. The preface explains the *raison d'être* of the work and we are glad to quote it in full :—

When Agent of the North-Central Province I was directed by Government to prepare a *Manual of the Province*, and the materials which I then put together are now printed. I regret the incompleteness of the work, and hope that my successors may be able to bring it up to date in a later and more useful form I have to acknowledge obligations to many who have assisted me with information, and especially to Mr H C P Bell, Archæological Commissioner, who has helped me in various way. R. W. IEVERS.

Jaffna, 1899.

We are not prepared to admit that it contains any serious omissions. The maps alone —North-Central Province, Nuwarakalaviya, and Tamankaduwa—are most valuable, while the titles of the chapters—Physical Features and Topography, Ancient History, Modern History, Political History, Population, Inhabitants, Climate, Health, Religion, Oaths, and Ordeals, Revenue and its Collection, Irrigation, Agriculture, Food Supply Roads, Archæology, Trees, Shrubs, &c., Beasts and Birds, List of Sinhalese words used in a peculiar sense or used only in the North-Central Province, and Forests,—quite belie—superficially, at least—any apology for incompleteness. We notice Mr. Ievers quotes from White's Selborne: "Every Kingdom, every Province, should have its own Monographer" and—following in the footsteps of Sir A. C. Lawrie with the Central Province—Mr. Ievers could hardly have been surpassed as the chronicler of things as they have been, and are, and might be, in the North-Central. On a cursory glance we have found this manual of 276 pages in every way admirable and its translation into Sinhalese, and even Tamil, should prove a profitable as well as most useful task for an official.

COOPER, COOPER, & JOHNSON.

THE DAWN OF RECONSTRUCTION.

After months of delay owing to the fact that a promised £10,000 was not forthcoming there seems at last some chance of the reconstruction of this business taking shape. It seems that there are really to be two concerns, the retail shops being separated from the plantation properties. Existing shareholders will have an opportunity of taking up the shares in the shops business, and it is satisfactory to note that all debenture or other first charges are to be got rid of. Of course the reorganisation proposals will involve a wholesale reduction in the capital, and shareholders will be asked to contribute 1s 6d per share, but this assessment will be reissued in the shape of second debentures. We await the full details with some curiosity, and shall be glad to know that something has been saved from the wreck.—*Investors' Review*, Nov. 2.

THE GEOLOGY OF SOUTH-CENTRAL CEYLON.

We direct attention to an interesting paper by Mr John Parkinson, read before the Geological Society, on the Geology of South-Central Ceylon. Mr Parkinson visited Nuwara Eliya, Hakgala, and other popular places during a visit, with Mrs Parkinson, last year—on their way round the world. The "notes" are published below.

NOTES ON THE GEOLOGY OF SOUTH-CENTRAL CEYLON.

BY JOHN PARKINSON, ESQ., F.G.S.

I.—INTRODUCTION.

The following notes are the result of a tour of a few weeks duration in the south-central parts of Ceylon. The time spent in the island was brief, and the work was done entirely upon inland sections; but in many places the exposures of rock are good, especially along the lines of railway. Petrological descriptions of Ceylon rocks are not wanting, but details of their field-relations are few, and it is hoped that the following paper may direct attention to the interesting problems which are likely to arise from such an investigation.

II.—THE GNEISSOID GRANULITES.

(*a*) ON THE CEYLON GOVERNMENT RAILWAY FROM RAMBUKKANA EASTWARD IN THE DIRECTION OF ALAGALA.—Leaving the station at Rambukkana, and proceeding along the metals, we walk over country which is flat, or nearly so, for about half mile, when we come to a small cutting. Here is exposed a rather coarse* granitic rock with pinkish brown felspars up to ·3 across. In about six yards this gives place to one more finely grained, rather saccharoidal in appearance, and speckled with patches of mica.

On the opposite side of the railway line the rock is banded, but not in the clear even way which, for instance, characterises the gneiss on the south side of the St. Gotthard Pass. The darker parts are rich in hornblende and brown mica, and contain little or no quartz. These bands often have a wavy habit, as though torn, and sometimes small black patches, like fragments of bands, appear isolated in the more granitic rock. Rather frequently we find large felspars rounded in outline, and an inch or more in diameter. In 25 to 30 yards a very hornblendic rock crops out, followed in turn by one conspicuously banded. We find next the hornblendic rock veined by the

* Granite and granitic are used merely as field terms; as will be seen, the structure of the rocks here described is not that of a granite.

granitie : some of the veins are only 5 inches across, and frequently contain a fair proportion of the darker minerals. The hornblendic rock itself often exhibits much felspar. Sometimes long lenticular bands of the dark rock appear; at others it is represented merely by a few broken minerals.

A very fine section is exposed near the 54 benchmark. This shows in some places the rock beautifully and wavily banded, the darker parts varying somewhat in their proportions of hornblende and mica, and hence in colour. In places a light-coloured vein cuts across an older banding and yet seems to form an integral part of the rock; at others, the bands are disjointed and lie in fragments in the lighter matrix as though broken, while occasionally we find strongly-marked puckers. The gigantic rock varies in texture, and sometimes for a foot or so, is almost free from dark folia.

Thin sections show the dark rock to consist of a mosaic of green hornblende-crystals, extremely irregular in shape, and plagioclase, the former predominating in quantity. Occasionally, rounded grains of the hornblende are enclosed in the felspar. Apatite is very plentiful, and small zircons are not uncommon. The section also contains a little pleochroic augite with the characteristic colours of hypersthene. The specific gravity of the rock is 2 95.

The granitic rock, taken at a point where it possesses a minimum of hornblende or mica, is of medium grain or rather pink in colour. A thin section discloses microcline in considerable quantity, some orthoclase with microperthitic intergrowth, and a good deal of plagioclase. Quartz is plentiful. In addition, the rock contains a few irregular flakes of biotite, zircon, and iron-oxide.

Specimens from the banded part of the same mass are characterized by rather small hornblendes and micas, often with a few larger individuals of the former scattered through the rock. The specific gravity of such a rock is 2·82.

One possessing well-marked bands has a peculiar though quite distinct foliation, making an angle of about 45° to the direction of the bands. Under the microscope the rock is seen to consist of plagioclase, orthoclase, quartz, green hornblende, a little brown mica, zircon, and apatite : the darker minerals predominating in certain parts. and, together with less quartz than in the remainder of the slide, constituting the banding. The proportion of mica varies and in several instances it is associated with hornblende in a way which suggests very strongly its formation from that mineral. Iron-ores are abundant : for the most part they are probably ilmenite, together with some pyrites. The rock shows no indication of crushing and the foliation referred to above seems probably due to a fresh movement preceding final consolidation, causing the mica-flakes to take up a new position oblique to the plane of banding.

(*b*) ON THE CEYLON GOVERNMENT RAILWAY : WESTWARD FROM KADUGANNAWA.—Along the railway-line good but monotonous sections are exposed, essentially resembling those just described. The rock is both finely and coarsely banded, in some places the granitic veins measure 4 inches across, and although they frequently remain straight for some distance, yet they often vary in thickness, thinning out, then swelling. Occasionally the rock is gnarled, but this is not characteristic ; while not frequently the veins, by intersecting, produce an appearance of brecciation. This seems incompatible with any theory which would impute the banded structure to crush. A little farther west the rock, banded in its lower part, has a much more brecciated look in its upper. The whiter veins seem partly to enclose lenticular masses of the darker rock, and, in a few cases, to form a rather high angle with the underlying bands. In one case a long band of the darker rock, containing one or two small white bands, has been broken in two (fig. 3), so that probably the granitic rock is not all quite of the same age (fig. 4). Some coarse felspar-veins are certainly younger than the granitic rock which constitutes the more regular bands.

The cross-cutting granite-vein of fig. 4 is fine-grained and white in the hand-specimen, thereby differing from the granite described on p. 199. A thin slice exhibits large and very irregular grains of quartz, orthoclase in considerable quantity, microcline rare or absent, plagioclase, and a few greenish flakes of mica. The rock has a granulitic structure, the quartz usually penetrating the felspar, or in some places forming quartz vermicule. Its specific gravity is 2·62.

A dark band (specific gravity 3·28) in the banded rock below Kadugannawa shows in a thin section much pale green augite, altering to darker green hornblende. A brown mica is present, often presenting the appearance of a further product of alteration, but at others seemingly independent and in well-formed flakes with a distinct orientation. The rest of the slide consists of pyrites with some magnetite, untwinned felspar (not very plentiful), perhaps a little dolomite, and apatite.

A thin section, from a well-banded specimen from the same cutting, exhibits both in constituent minerals and in structure a great resemblance to those already described in § (*a*). In the lighter bands the only ferro-magnesian mineral is a mica; the remainder consists of grains of quartz, plagioclase, and some orthoclase. The extinction of the plagioclase symmetrically with regard to the trace of the composition-plane varies from 7 dg. to 9 dg. The darker parts of the slide are distinguished by large plates of green hornblende and a quantity of brown mica. The two minerals are intimately connected the one with the other ; in one instance the mica seems to be an alteration-product of the hornblende. The constituent grains of the light and dark parts interlock, and there is nothing approaching to a sharply defined line of contact. Quartz is less plentiful in the darker parts , a few grains of an apatite-like mineral occur, and an occasional crystal of zircon. There is very little quartz vermicule, but no microperthite.

In the cutting just below Kadugannawa (that is, on the west) the banded rock becomes strikingly garnetiferous. The garnets favour the dark parts in their distribution, but occur also in the lighter. One or two are of the size of a very small pea, but this is exceptional. A typical specimen is dark and micaceous, markedly foliated, slabby in fracture, and crowded with small garnets, about ·025 inch in diameter. A thin section shows that hornblende is entirely absent, its place being taken by the garnets. These are irregular in shape, rather cracked, and may be either pyrope or almandine.* Occasionally we find mica-flakes embedded in the garnet. The plagioclase gives symmetrical

* M Lacroix refers the garnet to almandine, Bull. Soc, min. France, vol. xii (1889) pp. 288, 306, etc.

extinctions from 18 dg.—18 deg. to 22 dg.—22 dg.

A thin section has been cut from a specimen taken near the small wayside station of Balana, on the Colombo side of Kadugannawa. Here the darker rock is in excess, but the white bands are still clearly seen in places. Under the microscope we see it to be closely related to the series already described. It contains a considerable quantity of hornblende and mica in approximately equal proportions.

A thin section has been cut from a very similar rock cropping out on the path to Lanka Tileka near Kandy. It is a black and white speckled, rock, the white constituents being granular and saccharoidal. Under the miscroscope the resemblance to the Balana rock is very great: the ferromagnesian silicates are somewhat less strongly developed, but iron-ores are not uncommon.

(*c*) Railway to the north of Mahaiyawa (Kandy).—A well-preserved banded rock is found to the north of Mahaiyawa. It sometimes contains quartz-grains of considerable size and, locally, garnet. Not far from this is a small quarry near the railway, excavated in a grey biotite-gneiss, streaked rather regularly by a red coarse granite, which occasionally contains large black mica plates. The rock is often very coarse, and exhibits big eye-shaped felspars such as were seen near Rambukkana. The bands which this granite forms run parallel with the general foliation, and from the field-evidence seem clearly to be an integral part of it. A slide cut from a fairly coarse specimen of the granite shows that it is essentially the same rock as that which forms the lighter-coloured part in the cuttings near Rambukkana (p. 199). Both rocks are characterized by microcline and microperthite, and by the presence of large, very irregular quartz-grains, while the ferromagnesian silicates are represented in both by a few flakes of mica. A thin section taken from a specimen showing the banding of this rock with the biotite-gneiss, demonstrates that no line of demarcation can be drawn between the two varieties, that is, that whole must have solidified at the same time. The darker part, that called biotite-gneiss, consists of an interlocking masaic of quartz and felspar, with orthoclase and plagioclase. A little microcline is found, and one or two grains of orthoclase contain microperthite. Biotite with a slight foliation is the sole ferro-magnesian silicate, and possesses the same characters as before. The specimen is almost identical with one from near Rambukkana.

A little farther north we come to a very slabby, rather fine-grained, and uniform pinkish 'granite,' the planes of parting being determined by mica-flakes. This 'granite' forms the greater part of the cutting, but the gneiss also appears, and specimens were taken showing the junction of the two. A thin section proves a perfect gradation between the two rocks and both are characterized by the same type of structure.

The pink rock contains no ferromagnesian silicate at all (except the black mica just referred to), and is distinguished by a quantity of orthoclase with microperthitic intergrowth, though the mineral does occur without it, and a little plagioclase. The rest of this rock consists of quartz in small and very irregular grains, which frequently occur as inclusions in the felspar and *vice versa*. The other part of the slide (that is, the gneiss) contains orthoclase without a microperthitic intergrowth, large and very irregular quartzes, some plagioclase, and no mircrocline in addition, we find a few flakes of mica. In passing from the pinker rock to that just described the first sign of change is the appearance of the larger grains of quartz, and then the gradual disappearance of the microperthitic structure. It seems clear that the pinkish 'granite' is a fine-grained representative of the coarse rock which streaks the biotite-gneiss in the small quarry above described.

The rocks of Kadugannawa, Rambukkana, and Mahaiyawa are usually well foliated, and commonly banded. The dark bands are characterised by green hornblende in varying quantity, and the association with this of a brown mica. Garnets are found locally. Field-evideuce shows that the inter-relationship of the light and dark bands may be best explained by the streaking together of the component parts of a magma which had undergone differentiation, and that occasionally this process was carried to a rather unusual extent.

III. Contact of Limestone and Pyroxene-Granulite.

Railway between Matale and Ukuwela.—On leaving Matale Station we see, first, a few outcrops of white crystalline limestone, followed and overlain by hard red soil. This exhibits a number of small ferruginous concretions, which are, however merely the outcome of a weathered condition, for internally it is mottled red and yellow, and is apparently an argillaceous soil rich in iron.

In a short distance we come to a level crossing, and on the left hand side of the track a small section is disclosed by the railway-cutting. The dominant rock is a crystalline limestone. but in this, and looking like an approximately horizontal dye, is a fine-grained rock rather saccharoidal on a fractured surface, but with a greasy lustre. This very closely resembles the pyroxene-granulites exposed on the road to Hakgala from Nuwara Eliya (see p. 207). This rock which I will call 'the Band,' in order not to prejudge the question of its intrusive nature, is about 4 inches thick at the only place where its upper and lower surfaces are seen. It can be traced for about 5 yards, the base not been seen; and in one place it forks, and partly includes a mass of limestone about a yard square.

After this exposure, we find a good cutting of well-crystalized limestone (specific gravity=2·86), followed by another of red rock similar to that seen before. but less concretionary on the weathered surface. This is succeeded in turn by limestone, and again by the red soil, which must be a kind of laterite.

Thin sections from the 'Band' and limestone will now be described. In a slide cut from a specimen of the former (specific gravity=2·96) the dominant mineral is a pleochroic augite. In an orthopinacoidal section the colour for vibrations normal to the prismatic cleaveage is a pale pink with a slight tinge of crimson; at right angles a pale, rather bluish, green. The pleochroism thus closely resembles that of hypersthene. The polarization-tints are brilliant, rather recalling those of olivine. Occasionally this augite is of a medium shade of sage-green, non-pleochroic or but feebly so, and probably merely a variety. Mixed in with this augite are a few irregular grains of pale red garnet, which are absent in a second slide. The augite is altering to brown hornblende, pleochroism of which

ranges from a yellow to a red-brown. There are also a few grains of pyrites. Brown mica occurs in other specimens. These darker minerals constitute the greater part of the rock. The rest of the slide is made up of clear and colourless plagioclase, with well-marked twins and extinction-angles of 14 dg. to 17 dg. (agreeing with oligoclase) on either side of the trace of the plane of composition.

A thin section, cut from a specimen showing the contact between the 'Band' and the mass of limestone which appears to be included in it, exhibits points of interest. The aspect of the 'Band' is greatly altered. It is fine grained, rather pink in colour, and discloses no distinctive minerals when examined by the naked eye. The lime stone is not so coarse as in the cutting nearer Ukuwela, but is crowded with green malacolites. At the junction exists a line of dark minerals. Under the microscope the 'Band' is represented by a fine-grained aggregate of calcite and malacolite, the latter preponderating, the former interstitial. The smaller grains of malacolite are full of inclusions, perhaps of a carbonate. The limestoen consists of plates of dolomitic calcite,* and is exceptionally rich in malacolite, thus resembling the rock on the other side of the junction, except that the carbonates predominate over the malacolite, and the whole is coarser. The last-named mineral becomes more plentiful as we approach the boundary, and is also serpentinized along cracks and edges; while near the junction many grains are converted into yellow and green serpentine. The line of demarcation between the two rocks consists of greenish and yellow serpentine, whithout definite form and showing but few traces of its origin from malacolite.

A second contact-section, cut from another specimen a couple of yards or so away, unfortunately gives but little information about the composition of the 'Band' near the junction. We find the same serpentinized zone; and the line of demarcation between the two rocks is not strongly marked, so that it is difficult to say where one begins and the other ends. This section is, however, noteworthy for the grains of spinel embedded in the serpentine-zone. There is some iron-oxide, possibly of the nature of a residue, and a few small flakes of reddish-brown mica, almost colourless for vibrations normal to the basal plane. The spinel is of a dull sage-green, considerably cracked, and occurs in rounded subangular grains up to ·025 inch in diameter.

Perhaps some monticellite may be present, as well as malacolite. The limestone 12 inches from the junction contains abundant grains of malacolite, fresh and not serpentinized, and a few plates of slighty-coloured augite. The dolomitic calcite here and in the cuttings to the south often has a vermiculated structure, owing to the presence of threads of a colourless mineral with an exceedingly low index of refraction and apparently no action on polarized light.† Very rarely we find a few flakes of yellow-brown mica, and still less frequently a grain of spinel.

* The rock effervesces sharply with cold hydrochloric acid. See Bull. Soc. Min. France, vol. xii (1889) p. 336, where the presence of both calcite and dolomite are recorded by M. Lacroix.

† An identical structure is described and figured by M. Lacroix in the dolomite of these rocks; see Bull. Soc. Min. France, vol. xii (1889) pp 337-38 and fig. 60.

Prisms of pale blue apatite are common, ranging up to ·07 inch in length When detached entirely from the rock and examined in polarized light we find them to be strongly dichroic (pale blue to pale claret-red).*

A specimen of the 'Band' distinguished by the presence of large brown plates of mica, 1 to 1½ inches across, deserves a few words. The rock is much lighter in colour than normal specimens. A thin section shows that there are three primary minerals and one secondary—the former are malacolite, mica, and spinel, the last named brownish hornblende. This replaces the malacolite completely in many places †. It is yellowish-brown for vibrations parallel to the prismatic cleavage, and possesses a fairly strong absorption. The mica includes plates of the hornblende, and extends its irregular edges amongst the hornblende-crystals. It is brownish-red for vibrations parallel to the basal plane, and pale straw at right angles to this direction. The mica also encloses small grains of green spinel, which make only the faintest attempt at an idiomorphic outline. The same mineral occurs embedded in the malacolite, and occasionally forms conspicuous aggregates which measure ·1 inch across. The malacolite-grains are closely packed together, cracked, and rather stained. Very commonly the hornblende and mica contain a large number of small rounded greenish inclusions, with a high refractive index They are so minute that their double refraction cannot be safely estimated, but it seems that a regular gradation can be traced from them to indubitable grains of spinel, and it may b inferred that they are that mineral.

The laterite exposures found alternating with those of the limestone must originally have been represented by a crystalline rock of some such type as that described from the west of Kandy or from the neighbourhood of Bandarawella. ‡ Accordingly we find the less difficulty in correlating the small rock-mass termed the 'Band' with those between Nuwara Eliya and Hakgala, which it closely resembles. The presence of crystalline limestone above and below this 'Band' and the way in which it partially encloses a mass of the former are unaccountable by any explanation other than that of intrusion.§

IV. HORNBLENDE AND PYROXENE-GRANULITES.

(*a*) THE NEIGHBOURHOOD OF BANDARAWELLA.—In the quarry on the hillside above the station we find a garnet-bearing hornblende-felspar-quartz rock with a very granulitic structure (specific gravity=2·76). It is often well banded,

* See A. K. Coomara-Swamy Quart. Journ. Geol. Soc. vol. lvi (1900) p 600; Lacroix, Bull. Soc. Min. France, vol. xii (1889) p. 339; and C. Barrington Brown and J. W. Judd, Phil. Trans. Roy. Soc. vol. clxxxvii (1896) A, p. 212.

† Some iron must be present in the original mineral.

‡ Decomposition *in situ* seems to be the true explanation of the formation of this type of soil in Ceylon.

§ I am of opinion that the peculiar mineralogical composition of the two rocks described above, namely, the representative of the 'Band' at the junction with the limestone, and the malacolite-mica-spinel rock, may be best accounted for on the hyhothesis that local incorporation of the limestone accompanied the intrusion.

the more felspathic containing much quartz, but frequently such parts, instead of forming bands, occur as patches coarser than the rest. The felspar is greenish, which gives the rocks a rather dark appearance, and, by the aid of the quartz, a greasy lustre. Occasionally we find large eye-shaped felspars about 1·5 inch in length. A typical specimen is a finely-banded rock, the darker parts being composed of garnet, magnetite, and hornblende. These bands vary in breadth from about ·1 inch to mere lines. To these three constituents the microscope adds a mineral, which I think is apatite. The magnetite is often embedded in the garnet; its outlines are irregular or sinuous. An angle or a side of the garnet is often finished off by hornblende, and flakes of the latter frequently connect small outlying grains of the former. A few crystals of zircon are present. Quartz is abundant, and occurs in the usual elongated grains, which occasionally divide and ramify among the other constituents. The felspar is, for the most part, orthoclase with microperthitic inter-growth; but a little plagioclase is found.

In some specimens the garnetiferous parts of the rock are represented by a short band, about ·4 inch broad, composed almost entirely of garnet, while in other places the mineral is aggregated into patches.

A specimen collected at the station before Bandarawella is essentially the same as the banded rock of the quarry above described. It is compact and greenish in colour, slightly banded, and with a greasy lustre. The irregular outlines of the garnet and their association with green hornblende, magnetite, and the apatite-like mineral, merely repeat the characters of the Bandarawella rock. A very few flakes of brown mica are found. The largest garnet is about 0·10 inch in diameter.

Similar rocks are met with by the new road which runs along the side of the hill above Bandarawella village. The numerous cuttings usually show the common sandy soil, which seems certainly to result from the disintegration *in situ* of the gneiss. The bands which characterized that rock are still clearly visible, and even the remains of the garnets can be seen as reddish spots. A few small quarries and road-cuttings show a little variation in the character of the rock. Sometimes no garnets at all appear, and the rock is uniform when seen from a distance. Frequently, however, closer inspection reveals the presence of a few dark bands (specific gravity=3·16). Such and one possessed green hornblende as its dominant constituent, while a pleochroic augite was common, and biotite not rare. The rest of the slide was composed of plagioclase, as usual quite translucent.

A thin section cut from a banded rock near here showed that, as in all instances met with of banded rock in Ceylon, no line of demarcation could be drawn between the dark and light portions of the slide. The darker parts contain hornblende and pleochroic augite; and more sparingly, magnetite, brown mica, and garnet in order of frequency. The greater part of the hornblende is an alteration-product from the augite. The remainder of the specimen is a light greenish rock containing large quartz crystals, but as a whole much finer in grain than those from the Station Quarry at Bandarawella. Some red garnets about ·03 inch in diameter catch the eye, and also a few flakes of mica.

(*b*) ROAD FROM NUWARA ELIYA TO HAKGALA—In the quarry at the end of the lake at Nuwara Eliya occurs a dark greenish rock, with greasy lustre and some variation in degree of coarseness. Felspar is present in considerable quantity, and also conspicuous elongated grains of quartz.

A specimen, less finely grained than usual, has been sliced for examination. The ferromagnesian silicates (both biotite and horn-blende) are inconspicuous. The two constituents which build up the greater part of the rock are quartz and orthoclase with microperthitic structure. Some of the felspars measure ·4 inch across. The quartz is occasionally micropegmatitic, and accessory minerals are plagioclase zircon, pyrites, and (?) apatite.

Cropping out by the side of the road to Hakgala, close to the quarry just mentioned, is a garnet-bearing rock closely related to the above, but more finely-grained and richer in the ferromagnesian silicates (specific gravity=3·11). A little farther on, in a quarry on the left bank of the stream, the rock of the Nuwara Eliya quarry appears. The rock is traversed by coarser quartz-felspar veins, essentially the same as the coarse patches from the Nuwara Eliya quarry, and in these rather large flakes of mica are scattered. Occasionally the mica-flakes have a distinct orientation.

A small exposure above and to the right of the road consists of a banded garnetiferous gneiss, containing some quantity of pink felspar and a good deal of quartz. A vein or band of pink felspar and quartz, recalling the pinker parts of the gneiss (from which indeed it cannot be separated), traverses the rock roughly parallel to its foliation. It measures about three inches across, and contains patches of mica. No hard-and-fast line as of a contact can be drawn between the two.

About 230 paces down the road we find the compact greenish rock of the Nuwara Eliya quarry (specific gravity =2·66). Its sections prove that this type is identical with the pinkish banded gneiss, in spite of the rather striking difference of colour: hence there can be, I think, no doubt that they form one group.

A well-banded rock crops out about ½ mile below the entrance to Hakgala Gardens. The more felspathic part is compact greenish-yellow, of uniform texture, of specific gravity 2·59, and contains a pyroxene and a few inconspicuous red garnets. The pyroxene is monoclinic and pleochroic, but the pink colour which distinguishes this mineral elsewhere is almost imperceptible. The rest of the section consists of an aggregate of quartz orthoclase (microperthite and microcline absent) and plagioclase (extinction 7°), and a few grains of zircon.

(*c*) OHIYA.—The rocks of the railway cutting between Ohiya and the ascent to Horton Plains are identical with those of Nuwara Eliya and the road to Hakgala, so that a detailed descriptionh is unnecessary.

Taken as a group, these rocks are distinguished, with a few exceptions, by a greenish colour accompanied by a greasy lustre, and usually by the presence of garnets. These garnets are associated with hornblende, a pleochroic pyroxene, magnetite, and frequently biotite. Irregular grains of quartz are common. There can be, I think, no doubt that these rocks are closely related to those of § II, p. 202.

Mr T H Holland,* in a most valuable memoir, describes 'a group of Archæan Hypersthenic Rocks in Peninsular India' under the name of the Charnockite Series, and states that members of it occur in Ceylon. Some stress is laid by Mr Holland on the presence of the rhombic pyroxene. So far as my work goes, it tends to show that hypersthene is not distinctive of the Ceylon rocks. I have not, in fact, found the indubitable mineral at all (though it has been recorded by Mr A K Coomara-Swamy), but a monoclinic pyroxene with the pleochroisom of hypersthene does occur.

The preceding observations show that the series of igneous rocks studied are closely related one to the other, and have arisen through the variation of a single magma. This variation, in places, has resulted in a well-marked differentiation into acid and basic parts which, by subsequent intermingling, have produced a banded gneiss. Further the evidence brought forward indicates that these rocks are younger than the crystalline limestone and are intrusive into it.

In conclusion, I wish to express my indebtedness to Prof. Bonney, D Sc F R S, for valuable suggestions and help during the preparation of this paper.

* Men, Geol, Surv, India, vol. xxviii (1900) p. 119.

PRODUCE AND PLANTING.

On the subject of "Teas of Low Grade" the *Grocer*, says: "'Keep your tea customers together,' an old grocer used to say, 'and other goods will virtually sell themselves. People who come to buy good tea,' he would add brightly, 'stop to buy other things, and the net all-round profit is satisfactory.' Many grocers are now acting on that advice, and are working energetically to keep their tea customers together. Moral suasion, taking the form perhaps of a little personal homily, is not a neglected method. It tickles the ears of consumers, so to speak; whilst in numerous cases printer's ink is largely employed. During the winter season a number of persons drink more tea; consequently they become, in a sense, more important to their grocer, and, like a wise man, he is handling them accordingly. He keeps in touch with them, telling them what is good, giving small samples and excellent advice. One of our subscribers, addressing his tea patrons, states that 'recent exhaustive experiments by an eminent physician have demonstrated the value of pure, high-class tea as a stimulant and dietetic . . . Many low-class and adulterated mixtures of so-called teas are placed on the market by large advertising firms, and it behoves every householder to view with considerable suspicion brands retailed at prices which, with the cost entailed in advertising them, render it impossible to give anything like value for money.' It is also pointed out that teas of low grade 'contain an excess of tannin and other ingredients injurious to the nerves and irritating to the alimentary canal.' Harping on the same theme whilst eager to keep their tea customers together and attract fresh buyers, another firm of grocers describe how they have established a reputation for the sale of good tea. 'We watch,' they write, 'what other people are doing; we personally sample all the advertised and unadvertised teas in the town, and do not rest until we have beaten or at least equalled them; thus our blends are the concentration of years of study and skill.' It will be perceived that, so far as tea is concerned, the education of consumers is now taken in hand with some degree of confidence; and we are glad to notice that they are being warned off low-grade stuff. That article does not give much satisfaction to the buyer; it is not really economical in use since it does not 'go far' whilst retailers get little profit or credit from the sale of an inferior commodity. Their present action by way of pushing finer qualities, is worthy of hearty commendation. It is pretty sure to be successful in the long run."

While efforts have lately been made and with success, to improve the condition of the tea market by restricting production in India and Ceylon, there is apparently the prospect that tea cultivation in Natal will tend to expand. In the latest report of the Commissioner for Agriculture in Natal it is estimated that the yield for the year ended June 30 last was 1,600,000 lb. in contrast with 1,300,000 lb. in the preceding twelve months and 1,000,000 lb. in 1899. Something like 500 acres more land have been planted in tea in the Colony since 1899, and it is expected that within two years the yield will reach 2,000,000 lb. while the hope is expressed that it will shortly be increased so much as to supply the whole requirements of South Africa.—*H & C Mail*, Nov. 1.

CULTIVATION OF THE OYSTER-SHELL.

Geraldton, Nov. 6.—Some years ago, at the instance of Messrs. Broadhurst, M'Neill and Co, the Government of the day sent Mr Saville-Kent to inspect the waters of the Abrolhos with a view to the cultivation there of the Nor'-West coast variety of mother-o'-pearl shell. This expert reported in favour of the experiment, and some of the Nor'-West pearl oysters were deposited in the shoal waters of the Pelsart lagoon. Mr. Broadhurst, while recently visiting the islands, had as company the Rev. P U Henn, who was collecting conchological specimens for the Sydney Museum. This gentleman picked up a young live m.o.p. shell, and Mr. Broadhurst sent the specimen away for expert examination and it has been pronounced, true Nor'-West shell, "Meleagrina margaritiferae, and identical with those planted by Mr. Saville-Kent. There are doubtless many others three by this time, and the above discovery tends to show that the Nor'-West shell will thrive in the Abrolhos waters.—Perth (W A) *Herald*.

PLANTING NOTES.

The Clove Crop at Pmba.—News from Pemba states that the clove crop which promised to be a very good one this year, is practically at an end, there being nothing left on the trees. The Labour Bureau which was established by the Zanzibar Government a few months ago, has rendered great services to the Sister Island where Mr. Commissioner Farler who had charge of the movement at Chaki-Chake has been able to help many a planter to collect cloves which otherwise might have been lost.—*The Gazette*, Oct. 30.

Pruvian Rubbr Synd, Ld. (71,664).—Regd.—Oct. 23, with capital £1,500 in £1 shares to acquire any estates, lands, plantations, premises, etc., in Peru or any part of the world, and to carry on the business of cultivators, collectors, and manufacturers of and dealers in India rubber, gums, coffee, cocoa, rice, grain, tobacco, spirits, gold, silver, copper, tin, timber, wood, hides, skins, ivory, etc. No initial public issue. Registered without arts of association by Waterlow Brothers and Layton, Ld. Birchin Lane, E C.—*Investors' Guardian*, Nov. 2.

TO ALL PARTS OF ASIA, AFRICA, AMERICA AND OCEANIA.

Seeds & Plants of Commercial Products.

Hevea Brasiliensis.—Orders being booked for the coming crop, August-September delivery 1901 : booking necessary before the end of April ; quantities of 100,000 and over at special low rates. Plants available all the year round. 100,000 and over at special low rates. A leading Rubber planter in Sumatra, who purchased 50,000 seeds in 1899, and 100,000 in 1900, writes us, under date 15th November, 1900:—" I received your letter of 20th October, from which I learn that you added another case of 5,000 seeds to replace the loss, &c. I am satisfied hereby, and even after this adding I am satisfied by the whole delivery of this year."

Castilloa Elastica.—True superior variety cultivated in Mexico, seeds from specially reserved old untapped trees. Orders booked for August-September delivery, 1901, booking necessary before the end of March ; large quantities on special terms ; Plants in Wardian cases.

***Manihot* Glaziovii.**—Seeds and Plants available all the year round, 100,000 and over at special low rates. A Mexican planter, in sending an order for this seed, wrote on the 22nd August, 1900:—" If they arrive fresh and germinate easily I may send you larger orders, as they are for high ground where the Castilloa does not thrive."

Kickxia Elastica.—(*Funtumia Elastica*).—Seeds and Plants, orders booked. (Lagos rubber.)

Ficus Elastica.—Seeds available in May-June ; booking necessary before the end of March ; also plants.

Urceola Esculenta and **U. Elastica.**—Same as above. (Burma rubber.)

Parameria Glandulifera.—Orders booked for seeds for January-February delivery ; also plants; immediate booking necessary. (A good rubber creeper of Malacca.)

Landolphia Kirkii.—Seeds in July-August, early booking necessary. Plants can be supplied all the year round. (A highly-recommended species.)

Chonemorpha *Macrophylla*.—Seeds and Plants ; orders booked. (A very valuable rubber-yielding creeper.)

***Memusops* Globosa and Payena Leerii.**—Seeds and plants in July-August, booking necessary before April.

Achras Sapota, Willughbeia Firma, W. Edulis and other **Rubber and Gutta Percha** yielding Trees and Creepers, Seeds and Plants.

Cinnamomum Zeylanicum (Cinnamon superior variety). New crop of seed in April to June, booking necessary before the end of February ; also plants.

Coffea Arabica, Liberian Hybrid and **Maragogipe Hybrid.**—New crop March-April ; immediate booking necessary.

Cinchona Ledgeriana.—Seeds now ready, also other varieties.

Seeds and Plants of Nutmeg, Clove, Sandalwood (white and red), Pepper, Cardamom, Vanilla, Cacao, Tea, Coca, Fibre, Medicinal and Fruit Trees, Shade and Timber Trees, Eucalyptus various varieties, also Palms, Bulbs, Orchids, &c.

Our enlarged Descriptive Price List of Tropical Seeds and Plants of Commercial Products of Foreign countries for 1901-1902, now being prepared, and will be ready in a few months.

" South Africa."—The great authority on South African affairs of 25th March, 1899, says:—" An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants, of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbling. We recommend the great Powers and Concessionaries under them to go to William Brothers."

Price List of Seeds and Plants for Ceylon use, post free, on application.

Our new Descriptive Price Lists of Seeds of Shade Trees for Coffee, Cacao, Tea, Cardamoms &c., Timber Trees, Trees for Avenues, Hedges, Wind and Shelter Belts, Ornamental Trees, Shrubs and Climbing Plants ; and Seeds and Plants of Palms, Calamus, Pandanus, Cycads, Tree and other Ferns. Crotons, Orchids, Bulbs, Dracænas, now being prepared, and will be ready shortly.

***Special* Arrangements** made with foreign Governments, Botanical and Agricultural Departments, Planters and others for supplying seeds and plants of Commercial Products in large quantities.

Agents in London:—Messrs. P. W. WOOLLEY & Co., 90, Lower Thames Street.

Agent in Colombo, Ceylon:—E. B. CREASY, Esq.

Telegraphic Address: J. P. WILLIAM & BROTHERS,

William, Veyangoda, Ceylon. *Tropical Seed Merchants*,

Lieber's, A.I. and A.B.C. Codes used. Henaratgoda, Ceylon.

THE TEAK TRADE OF NORTHERN SIAM.

The British capital invested in the teak forests of Northern Siam is about two millions sterling, and three-fifths of the total teak trade of the country is in British hands, the bulk of the remainder belonging to Chinese and Siamese. British foresters and British companies were the pioneers of the trade, and those now concerned in it have lately been caused some anxiety by a change in the old conditions and the concentration of the forest administration as well as the establishment of new rules by the authorities at Bangkok. There are two main channels for the trade one down the Salwin to Moulmein, the other by the Me-nam and its tributaries to Bangkok. The timber floated down by the former, where the rains are plentiful and the valley deep, reaches its destination in a month or two; by the Me-nam Valley the time taken is often more than a year. Nevertheless, the trade by the Salwin, according to the last report of the British Consul at Chieng-mai (Zimmé), has steadily decreased in the last three years, probably because of the indiscriminate felling of the Burmese and Shan foresters prior to the new leases of 1897, since which time the work of extraction has been restricted and controlled by the leases, as well as by a British firm which finances the foresters. This firm has spent a large sum in making the new arrangements, and the increased inaccessibility of the timber causes a large and permanent outlay, so that some years must elapse before the returns will be commensurate with the outlay. On the Me-nam side there was a large and well-distributed rainfall, which floated out of the streams a large number of logs (as the stripped trunks are called), which had accumulated for years awaiting a favourable floating season, so that 120,000 full-sized logs, valued at about £3 a log, reached Bangkok, the largest number in any previous year having been 73,000 in 1893. These logs having thus got beyond the boundaries of the forests, escaped confiscation under the provision that timber lying within the boundaries on the expiration of the lease becomes the lessor's property, and this gave great relief to the British companies and traders engaged in the staple industry of Northern Siam, who would otherwise have suffered heavy losses. But, on the whole, under the new leases and the new regulations for forest conservancy, the Cônsul's opinion is that if the regulations are enforced with impartiality against all concerned, "British foresters and traders are entitled to anticipate, if not the same profits as heretofore, at least a maintenance in the future of the same proportion of the teak trade in their hands as in the past." Last year the value of the teak sent down the Salwin to Burma was over £75,000, that sent down the Me-nam and its tributaries about £350,000.—London *Times*, Oct. 25.

PLUMBAGO IN TRAVANCORE.

"C.' writes as follows in *Capital*:—

In a recent order of the Madras Government reviewing the Administration Report of the Travancore State for 1899-1900, a three-line reference is all that is made to the important plumbago industry which has been introduced into the country, mines being for some time past in excellent working at Vellanad, a place about 15 miles from Trevandrum. They have timbered shafts underground, are worked by Cornish miners, and turn out more than a hundred tons of plumbago each month. Last year, 1,600 tons were shipped to Europe. At present the main disadvantage is with regard to the existing arrangements for shipping. Shippers, including those of plumbago, have frequently to send their goods a hundred and forty miles to Cochin for shipment. This is certainly a lamentable state of affairs. Recently, the facilities which Quilon offers for the construction of a harbour have been ventilated, and the Travancore Durbar might do worse than examine the question seriously. We believe that the plumbago industry in Travancore has now emerged from the experimental stage and is justifying the enterprise of its promoters. The existence of the mineral in the country was established long ago by the late General Cullen, a former British Resident, but it wanted the boldness and enterprise of Europeans to found an industry out of it. There are said to be more than one or two deposits of the mineral within the State, but in the mines which are now working, though the plumbago is not always easy to find, experience has shown that good "pockets" exist to a paying extent. The plumbago is taken out in irregular lumps, stored in an open shed, broken up into small pieces, and all its sand, etc., separated. It is then washed, cleaned and sorted, and after a further process of picking and sorting, is packed for shipment. The shafts which descend to a depth of about 150 feet are well timbered, and the mines solidly and safely constructed. Labour is cheap in the Travancore State, and no difficulty, we believe, is experienced in obtaining a sufficient number of men, women and children for work, underground and on the surface, in the different departments of the industry. In fact, the labourers on the mines have already attained so much skill that those who are employed to sort the mineral after it has been washed are well able to differentiate the ore and to select from the entire mass the particular ore which is called "needle plumbago" and which fetches a higher price than the ordinary ore. The enterprise is a most laudable one, and it is for the Travancore Durbar to render it all possible reasonable assistance.—*M. Mail*, Nov. 15.

PLANTING NOTES.

THE TEA CAMPAIGN IN FRANCE.—In a letter from Mr. Renton, dated Grand Hotel, Calais, October 27th, are very glad to read:—"Our demonstration goes on right merrily. At Boulogne, Dunkerque and here we have now got several depôts besides those at Havre, Rouen, Caen, Dieppe, etc. Those shops may not sell much tea, but the result of those 'degustations' will be that in course of time we will knock China tea out of France."

TEA PRUNING.—This is the subject of a special article which we quote from "Tea" on page 407. It advocates the appointment of a scientific enquirer to give authority for any necessary change in the system of pruning, and the remarks that are made will, no doubt, receive the attention of all who intend to make of pruning a special study. The practice that prevails in Ceylon comes in for special mention, and the advice is given to prune only half the garden. Many other useful hints are thrown out.

PLANTING NOTES.

FOOT-AND-MOUTH DISEASE DISCOVERY.—A Reuter's wire dated Pisa, October 27, states Signor Baccelli, Minister of Agriculture, presiding at the opening sitting of the National Congress of Medicine, yesterday, delivered a speech in which he explained more fully than in his speech at Novara the method discovered by him for the cure of foot-and mouth disease. The speaker said that some time after having been appointed Minister of Agriculture he happened to be at Civitavecchia, and, hearing that there were cases of foot-and-mouth disease in the neighbourhood, he instructed the veterinary surgeon of the town to employ in the treatment of the diseased cattle the Baccelli therapeutic method, which consisted in injecting sublimate of mercury into the veins. He prescribed the following doses:—For calves, two to four centigrammes for each injection, according to the seriousness of the case; for adult animals, four to six centigrammes; and for bulls, six to eight centigrammes. The solution was to contain 75 millegrammes of sodium chloride (common salt) for every four centigrammes of sublimate of mercury. Out of 52 cases of the disease 52 were cured. In Sardinia, where the Baccelli method was also employed, there were 26 rapid and complete cures out of 26 cases. In short, all the cattle which underwent treatment at Civitavecchia, in Sardinia, and elsewhere were promptly and completely cured by the treatment. Signor Baccelli was warmly applauded and received many congratulations on his success.—London *Times*, Oct. 28.

BRITISH GUIANA—is by far the largest of the West Indian Colonies—says the London *Times*, October 28th, indeed, it is nearly fifteen times as large as all the British Antilles put together. The *Hinterland* is almost totally neglected. It contains at least 20,000,000 acres of land not beneficially occupied, "an area of country," says Dr. Morris, an unimpeachable authority, "equal to two Ceylons quite untouched." "These undeveloped Guiana lands," says the same authority in his report to the Royal Commission of 1897, "are amongst the richest existing in any part of the tropics." Mr. Chamberlain, at the instance of the late Governor and late Colonial Secretary of the colony, recommended the appointment of Mr. W D Barnes as Commissioner of Lands, Forests, and Mines in British Guinea. Mr. Barnes, who has had much experience of the climatic and mineral conditions of the Malay Peninsula, which are more or less similar to those of British Guiana, was recommended to the Secretary of State by Sir Frank Swettenham, the Resident-General in the Malay States, and his brother, Sir Alexander Swettenham, the Colonial Secretary of Singapore, as a person highly qualified for the proposed appointment. It was necessary, however, for the salary of the new Commissioner—which was fixed at £1,000 a year—to be voted by the Combined Court; this by a narrow majority of nine votes to eight has lately rejected the vote. We cannot but think that the action of the Combined Court was deplorably short-sighted and impolitic. The colony is manifestly unable, even if it were willing, to develope the *Hinterland* itself. The influence of the sugar industry appears to have been allowed, directly, or indirectly to frustrate Mr. Chamberlain's well-conceived measure for setting the development of the *Hinterland* on foot, or at least for giving it a fair and promising start.

THE INDIAN TEA CROP FOR 1901-2.—The *Indian Planters' Gazette*, in its issue of Sept, 28th, enters into calculations based on the best available information which show a probable falling-off in production of 12 million lb. We extract as follows:—

In our calculations we have taken into account the reduction in outturn already caused by, and likely yet to ensue from, more careful plucking and abnormal and unfavourable weather. Taking also into consideration our preseet position, relative to the different markets in which our teas are sold, we think the following approximate forecast will prove about correct:—

ESTIMATE FOR ALL INDIAN TEA, SEASON 1901-1902.

	lb.
Australia and New Zealand...	10,500,000
America	3,500,000
All other places...	5,500,000
	19,500,000
United Kingdom	157,000,000
	176,500,000
Left in India	9,000,000
Total	185,500,000

The total production for all India last season was 197,460,664 lb, deducting the above 185,500,000 lb, the probable shortage in output this season will amount to 11,960,664 lb, or in round numbers, (say) some 12 millions lb. The outlook is by no means so gloomy as was anticipated. * * Apart, however, from the above estimate, viewing the subject from the stand-point of the reports received from Home, we find that the average price for this season's new teas sold on garden account, is 0·51d better than last year's average. * * Calcutta averages, moreover, cannot well be compared with London averages, for the simple reason that the bulk of the fine and good teas produced is shipped Home direct, to be sold on garden account. London averages are therefore naturally higher than those realised out here. It will be seen from the statistics which we have furnished that the present position of Indian tea is strong, and the outlook a hopeful one. Our readers must not be misled into thinking that *all* gardens are realising an average of 8·42d per lb for their teas in London, or that *all* estates are only getting As. 5·6 per lb for their teas in Calcutta. The figures represent the *average* price for the sales during the periods named. There are gardens and gardens. Some will pull through the present depression and move strong in the future; others will gradually fall away and eventually become extinct. The law of the survival of the fittest must and *will* work so far as individual gardens are concerned, but the Indian Tea Industry will go on and gather strength in its course, and will come out all the better for having been tried by the fire.

MR. RENTON'S CAMPAIGN IN EUROPE.

London, Nov. 1

Mr. Renton has many interesting things to tell of his European Campaign. Demonstrations and tea lectures have been given in a large number of towns on the Normandy Coast with great success In one place, in fact, the people collected in a perfect throng, each one bringing some sort of household vessel from a bed-room ewer down to an empty can, in which to carry away the tea they expected to be presented with! In consequence of Mr. Renton's efforts also a number of depôts for the sale of tea have been established, and in Germany especially several firms have taken up the "business," and are pushing it by the aid of circulars, etc., extensively. It seems to me that Mr. Renton

CARRIES ON HIS PROPAGANDA VERY ECONOMICALLY,

and it is a pity he has not been better backed up by Ceylon this year as he is just at the critical time one might say of his work. If the money is not to be continued, it is almost to be regretted that it was given at the start. A little longer support, and Ceylon tea will be able to stand by itself—especially in Germany, where there is at present a strong temperance movement setting in, which must undoubtedly help the cause of tea immensely. This anti-beer drinking crusade pervades all ranks of society at present in Germany and Germans are not anxious to alternate beer with more coffee of which already they have sufficient. Here is where the opportunity for pushing tea comes in, and, I believe, the "Thirty Committee" by taking the moment wisely, could effect a great change in the consumption of tea at present in that country. Speaking of

THE AMERICAN TASTE FOR GREEN TEA,

Mr. Renton made a good suggestion. If, he said, some Japanese tea makers could be induced to come to Ceylon and show the Ceylon planters how Japanese Green Tea is made, it would place the question of whether Ceylon grown tea can be manufactured into Greens, similar to the Japan Greens, beyond a doubt; and also teach the planters how to do it. Or alternatively perhaps one or two Ceylon men could visit Japan and take notes. Doctors differ, and so this week the London merchants have been interviewed by an American who seems to think Green Tea no such desideratum as Messrs. Mackenzie and Larkin would impress on us. Whether he has the experience sufficient to make his evidence reliable, I should rather doubt, but at all events,

MR. FELS,

representative of a firm of the same name, has come over here to study the tea question from all points, with a view of pushing the article in the States. He appears to hold that Americans are just as likely to drink Black Tea as Green, and it is Black Teas that he purposes starting with, though he will sell Greens too, no doubt if he finds them go. The more Black Tea he sells the better, so all we can say is more power to his elbow. But the planters need not stop making Green Tea yet awhile, I imagine.—*London Cor.*

INDIAN TEA ASSOCIATION.

Royal Exchange Building, Calcutta, 5th Nov., 1901.

(*Extracts from the Proceedings.*)

Letters dated 4th, 11th and 18th October, from the Secretary, Indian Tea Association, London, were brought up for final consideration after previous circulation. The principal matters dealt with in these letters were:—

(*a*) Green Teas.—The London Committee had considered the circular issued in Calcutta on the 9th September, in which proposals for bulking green teas in Calcutta were advanced. They were in general agreement with the scheme outlined in the circular. Information was also contained in the letters regarding an offer made by the Baraoora (Sylhet) Tea Co., Ld., to manufacture 200,000 lb. of "faced" green tea for 1902 in consideration of the bounty. This offer had been accepted by the London Committee conditionally on (*a*) funds being available; (*b*) the tea made by the Company in 1901 being suitable; and (*c*) the teas being sent to the firms in America selected by the Calcutta Committee to deal with green teas.

The General Committee observed that the offer of the Baraoora Co. had reference to "faced" green teas which, they understood, were in demand in the United States. The scheme set forth in their recent circular, dealt with the unfermented or Ceylon type of green teas, which they believed was preferred in Canada. They regretted to find that, in response to the circular, only two Companies had offered to manufacture green teas on the lines suggested. The London Committee were to be informed of this. It was also to be added, in writing to London, that the Committee here intended to approach one or two of the larger agency houses with a request that they should take up the matter of manufacture and bulking.

(*b*) Proposed Tea Cess.—It was stated in the letter that a memorial to H.E. The Viceroy upon this question had been prepared, and was being signed in London. Subsequently, it would be forwarded to Calcutta for additional signatures and presentation.

(*c*) Crop Estimates.—In the letter dated 4th October, the opinion of the General Committee was invited upon the following resolution which had been adopted at a recent meeting of the London Committee, viz:—

'That in the opinion of this meeting it is advisable that monthly figures of production with comparative figures for the two previous years should be published at the end of each month commencing from the 31st July, 1902, to the end of the Season, so as to enable people to form their own opinions as to the probable size of the coming crop, and that the Calcutta Committee be asked for their opinion on this subject. And also (as a separate matter) whether the forecast based on the tea manufactured to the 31st August (in lieu of the 15th August) should or should not be issued in future years."

The General Committee, after thoroughly discussing the whole question, came to the conclusion that the most satisfactory method of procedure would be to restrict the information published by the Association to the fortnightly statements of exports. In other words to abolish entirely all estimates and returns of the crop because of the difficulty of procuring complete and correct figures. They thought it would not be practicable to obtain the particulars required for the monthly statements proposed by the London Committee. Moreover they recognised that the Director-General of Statistics was giving special attention to that aspect of the question which was dealt with in the statements of actual crop, hitherto annually issued by the Association. And they were of opinion that the returns which the Statistical Department was in a position to procure, were gene-

rally speaking, much more likely to be comprehensive and reliable than those obtainable by the Association. For these reasons they considered that, at the next Annual General Meeting of the Association, a resolution to discontinue the existing system of preparing and publishing crop statements should be proposed. These views were to be conveyed to the London Committee.

(*d*) REGULATION OF SALES.—In the letter dated 18th October, it was stated that the London Committee had resolved to resume the regulating of sales until the 31st January 1902, on the lines of the regulation of 1898-99. A circular had accordingly been issued to all Companies and Proprietors, explaining the importance of the matter and inviting support. The Ceylon Association had also been asked to co-operate.

The General Committee noted this announcement with satisfaction, and hoped that the regulation would be successfully carried out.

In the proceedings of the meeting held on the 20th September, reference was made to correspondence with Messrs. Aitken Spence & Co. of Colombo regarding the shipment of teas from Calcutta to Black Sea ports. The letter which it was then decided to write to Messrs Aitken Spenc and Co., had been forwarded in due course; and the Committee now had before them a further communication, dated 18th October, from that firm. In this it was stated that the owners of a line of Russian steamers were willing to establish a regular service between the East and Odessa, provided sufficient inducement were offered. Calcutta might possibly be included in the itinerary although it was feared that the stringency of the Russian quarantine regulations would be a serious obstacle. But even if this provod to be the case, shipments might be arranged on speial terms via Colombo. And in order that the owners might have some idea of the probable extent of the trade, Messrs. Aitken Spence and Co., asked for information as to the quantity of tea which would be likely to go forward to Odessa. They also enquired whether, in the event of special terms being arranged, Calcutta shippers would be prepared to enter into an agreement to ship by the line, which was run under the Russian flag.

The Committee noted this letter with interest. They were not, however quite clear as to whether the reduced tariff on Russian railways applied to all steamers flying the Russian flag, or whether it was restricted to the vessels of the Volunteer Fleet. Messrs Aitken Spence & Co. were accordingly to be asked to furnish information upon this point. If the reduced tariff did apply, the Committee were inclined to think that the Russian line in question might, by offering sufficient inducement, secure the bulk of the trade between Calcutta and Odessa. It was difficult to estimate the quantity of Indian tea which would be likely to go forward; but they noticed that the shipments to Odessa from 1st January 1901 to 30th September amounted to 560,000 lb. They were not at present prepared to enter into the question of an agreement, but they thought that if ample notice of the arrival of a steamer were given, and if the rates of freight quoted were favourable, practically all the cargo available would be secured. A reply in these terms was to be sent to Messrs. Aitken Spence & Co.

10. Considered a letter dated 29th October, from the Director-General of Statistics, enquiring as to whether there is recognised tare for tea chests. In the case of most of the tea imported into Calcutta by rail the gross weight of the packages was registered, and a deduction of 23½ per cent was made as representing the average weight of the chests. The opinion of the Association was asked whether this rate—which had been adopted twenty years ago—was still correct.

The Committee were of opinion that the principal changes during the last twenty years were (*a*) a reduction in the number of half chests, and (*b*) the introduction—since 1896—of patent chests of metal and veneer. These weighed from about 20 lb to 22 lb each, as against wooden chests at about 28 lb; and the average weight of tea per chest might be taken as 90lb. The use of patent chests had fluctuated; but the Committee thought that by referring to the statistics of the imports of such chests, the Director-General would be able to form a fairly accurate idea of the extent to which they were used. With the information thus obtained it would be possible to determine what correction, if any, in the deduction of 23½ per cent from the gross weight, was needed. A reply in these terms was to be sent to the Director-General.

H S ASHTON, Chairman.

H M HAYWOOD, Assistant Secretary.

STATE OF THE TEA TRADE.

The recent rise in the market value of Tea, which in some cases is very considerable, has lightened the previous deep depression, it might almost be said the despair, which has for some months existed among the growers and importers. No one will grudge this piece of comfort, coming at a time when there seemed so small a chance of improvement. But a bad crop in some or all of the Indian districts is, after all, only a matter of one season. It remains to be seen, even this year, how much of the deficiency in the older gardens will be filled from new land now coming into bearing, and which it has been said will yield many millions of extra lb. for several years to come. We are certain that the home trade cordially wish for renewed and continuous prosperity in the Indian and Ceylon industry. Better times, however, if they happily come, will afford an excellent opportunity for considering how far the recent extraordinary depression (due, of course, mainly to the production outstripping the consumption) may have been added to by the obsolete and costly organisation of the tea trade.

We are called on by every hoarding to remember the delicious teas of thirty years ago, but it is not added that the average price in bond at that time was 1s 9d per lb. while at the present time to probably only averages something like a third of that amount. Yet, notwithstanding this fall to something like one-third of the old price, the expenses connected with the import, sale and distribution of a chest of tea are, if anything, higher than they were a generation ago. In the interval, every other article of consumption sold through grocers has had the expenses connected with it reduced to a minimum, and the organisation of the trade has been modernised, so much so, indeed, that our predecessors, if they could come to life again, would hardly recognise their businesses. In tea they would be quite at home, for as it was in the days of the East India Company, so it is now, and many are so conservative as to believe that so it will ever be. That it costs ten or more times to sell a chest of Tea than to sell a hundred weight of Sugar is in the minds of such people a perfectly natural and inevitable state of things. Dock charges four times what they are in Coffee and immensely greater than in any other grocery, intricate weight notes and warrants of an aggravatingly useless and costly character—are some of the marks of antiquity which hallow the trade in the mind of some of its members. Unnecessarily long prompts, coupled with a system of deposits abandoned in all other commodities in Mincing Lane make matters worse. Then we have a system of public sales, well suited for potatoes or onions, but one main effect of which is to depress the price of medium and fine Teas. These points mainly affect the growers and importers of Tea, but they appear to accept the disastrous position as desirable, unavoidable, and inevitable.

It is true that we knew one respected member of the home trade, who so far agreed with them, that he said that he would as soon join attacking the four Gospels as the organisation of the Tea trade, hallowed as it was by long antiquity. We contend, on the other hand, that this obsolete system has materially aggravated the depression caused by the over-production of Tea, and that it will continue to be most injurious, whatever the price may be. Tea at 1s 9d could stand expenses, that Tea at 7d, 8d, or 9d cannot do.

While the growers and importers have had such terrible prices to contend with, it might be thought that the home trade would have found the sufferings of their suppliers highly beneficial, and it is likely enough that many of the less informed planters think so. As a matter of fact, the home trade, whether wholesale or retail, have never done so badly in Tea as they have done during the last few years. House after house with names honoured and familiar in the trade for generations, have given up their wholesale businesses. Others go on with their profits reduced to something like the funds would yield them without any trouble. The facts are quite notorious and familiar to every one connected with the trade. An immense sum of capital has been withdrawn, which incidentally used to steady prices, and to foster and create a demand for fine Teas. If things were to go on as they are doing now, far larger sums will yet be withdrawn, and businesses will perforce be so altered as to bring all teas to an even deader level of price, than even the very unsatisfactory one now existing. Nor is the position of the retail trader any better. Taste and care in tea, in which the older generation of grocers used to pride themselves, no longer pay, and cheapness is the aim of all distributors. The public, no doubt, are the greatest offenders in this respect, for, as *Punch* humorously remarked, the male giver of a dinner party boasts how much his Port costs, while his wife in the drawing-room tells her guests how little she gave for her tea at the stores. No doubt this feeling exists to a considerable extent, but there are yet left connoisseurs who appreciate fine tea and would gladly pay a reasonable price for it. If any effort were made to meet such a demand such buyers would rapidly increase, but it is worth no one's while to foster it. More fine tea is grown than ever, but it is so blended and muddled up that it is practically lost to the consumer. If the planters still further lose the support of the wholesale houses, who practically finance the 100,000 retail grocers of the kingdom, and if the public is allowed to continue to believe that the finest Tea the world produces can be sold wholesale at something like 1s per lb., when unpacked and unadvertised—things must go from bad to worse. Teas are already not sold on their value, but according to their cost, and of course the lowest cost secures the order, so that depression simply leads to more depression.

Things, indeed, have got into such a position that to find the remedy appears to be almost impossible. Here we have the grower on the one hand and the distributor on the other complaining, while some, at any rate, of the depression can be alleviated by concerted action. Such action is difficult, for between these two sections of the trade there is a great gulf fixed, imperfectly bridged by the brokers, who, quite unintentionally, keep the two sufferers from knowing each other's names on entering into each other's grievances. Yet if they would only come together they would find that to a large degree they were suffering from the same causes, and that they could do much to help each other and to bring about better conditions. We believe frankly that the interests of all parties are at the present time absolutely identical, and that by meeting together and openly talking things over they would find this to be the case. Sepcrated, the branches of the trade are quite powerless, but jointly they can effect much. In the question of Dock charges, weight notes, and so on, the aid of the trade is essential, and would be readily given. There are many other matters in which the distributors can help the growers, and any mutual attitude of suspicion can only arise from absolute ignorance of the feelings and desires of the other side. Had there been free and constant communication between the various sections, for instance, the late difficulty as to drafts could never have arisen. In almost every other Mincing Lane product, joint interests are looked after by a body representing them all, and fairly and carefully considering what each section has to say. Tea has been poetically described as the cup that cheers but not inebriates, but those who trade in it, or grow it, have all found it very bitter and anything but exhilarating of late years. To sit at tea is the proverbial acme of domestic bliss. Why should not the importing and home tea trade meet round a table, restore internal peace and talk over how things can be bettered? If no remedy can be found and nothing is done, at any rate they would get to know each other and would find that there were no Machiavellis on either side, but simply plain, honest people, who find the position intolerable and wish to alter it.—*Produce Markets' Review*, Oct. 26,

PEARL FISHING IN THE PACIFIC.

At the beginning of 1899 a Mr Wickham held a lease of some islands in the South Pacific, and his object was to develop a trade in pearls and mother-of-pearl. In June of that year Mr Leo Ferdinand Sachs agreed to purchase of Mr Wickham his interest in the islands, and paid a deposit. In August it was agreed that Dr Henry Lyster Jameson, who had made a special study of shell fish, should go out to the islands to look into the trade, that if a syndicate were formed to take over the islands the plaintiff should receive the appointment of scientific manager of fisheries, and that if he did not receive the appointment within six months he should be paid £150 by the defendant. The plaintiff went out to the islands, where he remained for eleven months. He was not appointed as scientific manager.

Yesterday Dr Jameson, who is lecturer at the Technical College, Derby, sued Mr Sachs, before Mr Justice Darling and a common jury, to recover the £150, and obtained a verdict for that amount. —*Daily Chronicle*, Nov. 1st.

"COOLY SANITATION."

(Paper read by Mr. MacLure at the Maskeliya Planters' Association Meeting on Wednesday.)

Mr. MacLure, in introducing the following paper, read at the Maskeliya Club on Wednesday, said that his idea in meeting it was that it might be a help to some of the younger members amongst them :—

"This is a question the importance of which is not sufficiently realised by a good many people.

"We can all remember the terrible death-rate through disease among our troops at one period of the war in South Africa. In response to the popular outcry, a Commission was appointed by Government to inquire into the working of the hospitals at the front. The results of the investigations of the Commission went to show that a large proportion of the deaths must have been due to the neglect of proper sanitary precautions.

"I think we might take this lesson home to ourselves. This and last year there has been a great deal of sickness amongst our coolies, and the death-rate has been higher than usual, and we have all been rather alarmed at the prevalence in our midst of enteric fever, an epidemic which, medical men tell us, is directly due to insanitary conditions of some sort. This abnormal sickness is no doubt due in a great measure to the seasons, but perhaps some of it is also due to the neglect of proper sanitary precautions in cooly lines. Anyhow we should see to it that everything is done that can be done to keep lines and surroundings clean, and prevent all sickness that is preventable, for our own sakes as well as the coolies. Having to pass and re-pass dirty lines might very easily affect Superintendents' health too. There may be contamination in the atmosphere as well as in water or milk.

"It has seemed to me that greater efforts might be made to try and get our coolies to show a little more attention to cleanliness. It is uphill work I know. I don't suppose there is a single planter, who has the welfare of his coolies at heart, who has not at one period of his career, made an honest effort to induce his coolies to keep their lines and surroundings cleaner, but spasmodic efforts are not enough. We must keep pegging away, and in time you will find coolies begin to appreciate the efforts, and show their appreciation by complaining of dirty neighbours, suggesting that they should be fined. I know a good many men look upon it as a hopeless and thankless task to try and instil any ideas of cleanliness into the cooly. Let us not forget that it is not so very many years ago when the lower classes in our own country were every bit as careless, and sanitary officers found the same indifference and even obstruction. It may be a disagreeable duty, but it is none the less a duty to see that our coolies live decently. The Superintendent who takes some trouble has his reward in better behaved coolies, not to mention the pleasure it would be to him in passing and re-passing his lines to see them swept and garnished. If they are allowed to live like pigs, coolies will behave like pigs.

"And now if I am not wearying you and you will forgive me for my little lecture, I will try and give you the results of my experience and efforts,—in the hope that they may be some little help to the younger generation of planters amongst us.

"The Superintendent should see to it that there is ample line accommodation for his labour force, crowded lines are a most fruitful source of disease. Better to have too much than too little line room. I am sure proprietors or directors would never be so blind to their own interests as to refuse to sanction necessary expenditure on lines. We all know what an important thing it is in the busy months to get our coolies to turn out to work, and how the outturn depends on the condition of the coolies as regards health. A room of 10′ × 10′ or 10′ × 12′ should be provided for, at most, every 5 labourers. Coolies should not be allowed to build in their verandahs; this excludes light and air from the rooms. If there is not sufficient room without the verandahs, then additional accommodation should be built. Nor should they be allowed to erect their garden fences bang up to their lines; there should be a good open space between lines and garden fence.

"In building a new set of lines the first essential is a plentiful supply of good water. I have some lines near a good supply of water, and others where the supply is rather scanty, the difference in health is most marked, and yet such is the callousness of the coolies that they prefer the less healthy lines, as they are on flat land, the others are on the hillside.

"If a plentiful supply of good water be not available, I will tell you how a rough and cheap but effective filter may be improvised. A cooly mason could make one in a few days. Build four walls of rough masonry, enclosing a space of 4′ × 4′ walls, say 3 ft. high; no mud or mortar should be used, it must be dry masonry; then at the bottom of the enclosure lay down charcoal, broken into small pieces, to the depth of about 1 ft.; then on the top of the charcoal put say 2 ft. of clean river sand. The water supply should be conducted in spouting or pipes on to the top of the sand. It will percolate through the sand, then through the charcoal, and find its way through the stone walls into the drain or spouting conveying it to the lines. It should be made as near the lines as possible, and it should not be put in the natural bed of the stream, or floods will carry it away.

"Care should be taken when applying artificial or othermanure, not to put it anywhere near the sources of the water supply.

"Next in importance to the water supply are clean surroundings, and with a lot of dirty and indifferent coolies this is hard to get, but not impossible. The cooly is a selfish creature and will do nothing for the general good, so a certain amount of compulsion must be used. Regular line-sweepers are I believe a mistake. Left to themselves as they are, they do little or nothing, and that little is useless. I believe the best system is to make each line occupant responsible for the space, immediely in front of of his room, and periodically to put on a small gang of coolies to clean up round about burning all rubbish that will burn, and burying the rest. This is the system in South India where the climate necessitates very strict attention to sanitation.

"I have walked through some of the villages there, and I was surprised to find how clean they were. What they can do there we can surely do here. Coolies who do not keep the space in front of their houses clean are fined. I have found a system of rough latrines to work fairly satisfactorily, but they must be made easy of access, and kept clean. It is a common sight to see a woman come out to the door of her room with a chatty full of rice water, and just throw it down right in front of the door. This should not be allowed. A good plan, for those who have a drain and running water round their lines, is to make paved receptacles, say one to every two rooms, into which the dirty water can be thrown. For those lines that have no running water, the same kind of thing can be made, some distance

away, and leading into a drain, which should be flushed regularly. In the light of recent discoveries, no stagnant water should be allowed near lines, and swampy places should be well drained.

"We all know what an unsightly, dirty, rotten thing the usual cooly garden fence is. If I had an estate of my own, and if it were paying fairly well, I would go in for galvanized wire netting for the fencing of cooly gardens. 5 feet netting can be got for about £5 per 100 yards. It would greatly help towards keeping surroundings clean, and would prevent gardens continually encroaching on the tea or line compounds. Another good fence can be made, cheaper but not so permanent, by those who have suitable timber available, and that is by sawing good splitting logs into lengths of say 5 feet, and then splitting up the logs into sticks, about one and half inch thick, in the same way as coolies split firewood, these sticks, which should be all the one length, can be nailed on to horizontals, fixed on to uprights in the usual way. Two good coolies I found could split about 300 of these sticks in a day. I do not believe in restricting coolies in gardens, it is a good sign to see them busy in their gardens, it means they have settled down, but they should not be allowed to make their gardens just where they please. To those who are convinced of the necessity for greater attention to sanitation in cooly lines, and wish to put their convictions into practice, I would say, tackle one set at a time, do it thoroughly, and when it is done, keep it right, and get your Kangany to help you. The coolies in the other sets will soon ask you do the same to theirs, and perhaps help you in your endeavours.'

The meeting closed as follows:—

A hearty vote of thanks was proposed by Mr G M ALSTON, and seconded by Mr G GREIG, to Mr MacLure for his most interesting paper. This was carried with acclamation. The meeting closed with the usual vote of thanks to the chair.

CEYLON AND INDIAN TEA AT THE PARIS EXHIBITION.

THE LATEST, LAST AND FINAL OFFICIAL REPORT

(Extracts from the report on the Indian Section by Mr. Benjamin J. Rose, Honorary. Secretary Indian and Ceylon Committee, Paris Universal Exhibition, 1900.)

THE CEYLON SECTION.

A full official report on the work of the Ceylon Section having been issued by Mr. W E Davidson, the Government Officer in executive charge of that section, it is only necessary to very briefly refer to Ceylon in this report.

By a friendly agreement with the Royal Commissioners for Ceylon, Sir Montagu Ommauney and sir Cecil C Smith, the Indian Committee consented to place an area of 3,750 square feet of spacein the Indian Pavilion at the disposal of the Ceylon Government for the display of exhibits from that Island, as well as a space of 3,065 square feet in the grounds for the erection of a tea house, in return for a contribution of £5,000 towards the cost of buildings, &c. This sum was later on reduced to £4,150 on the strong representations of Sir Montagu Ommanney. The Indian Committee were pleased to be able to give ultimately more than double the space granted to Ceylon without requiring any increase on the contribution paid by that Colony. The actual space granted was:—

		sq. ft.
In Indian Pavilion Ground Floor	...	4,766
Do do Gallery	...	3,715
Tea House and Grounds	...	5,728
Total	..	14,209

The arrangements made by the Government and Exhibition Committee in Ceylon, under the presidency of the Hon. Mr. F R Ellis, for the participation of the Colony in the Paris Exhibition of 1900, were admirably planned and executed. The whole of the 256 cases of exhibits were despatched from Ceylon in December, and arrived in Paris in good time, and Mr. Davidson, ably assisted by Mrs Davidson, was, by almost continuous work, under the most trying climatic conditions, able to have the whole of the exhibits installed by the opening day.

The Ceylon exhibits comprised the great staple products of the Island, tea, coffee, cocoa cinchona, spices, plumbago, &c., as well as the largest and most comprehensive collection of gems and precious stones ever brought together. The most popular exhibit was the large and well-executed Jungle Trophy, in which among other stuffed animals, were shown a full-sized elephant, a leopard, bears, deer, crocodiles, &c. This trophy was arranged by Mr. E Gerrard, of London, and was a never ending source of pleasure to visitors.

THE CHARACTERISTIC CEYLON TEA HOUSE.

in the grounds was largely patronised, and it occupied a better and far more prominent position than the Indian Tea Courts. Mr J H Renton, the special Ceylon Tea Representative at Paris, reports that during the six months the Tea House was open 134,257 pots of tea and 12,000 lbs of Tea in small packets were sold, a result which Mr Renton states exceeded all his expectations and he attributes this marked success to the following causes:—

(1) To the good quality of the articles, the tea being very carefully made and then poured, after five minutes' infusion, into an urn, heated by hot water;

(2) To the Sinhalese boys, with their rapid and Civil waiting; and

(3) To the aid of lady friends, journalists, and others, who from the first assisted in advertising the merits of the tea and the attractions of the Tea House.

The total number of exhibitors in the Ceylon Courts was 205; and the awards they gained were four Grand Prix, 19 Gold Medals, 60 Silver Medals, 61 Bronze Medals, and 47 Honourable mentions. The success of the Ceylon Section was undoubtedly due to (*a*) the ample funds lavished upon it; and (*b*) to the skill and energy with which the Government and the Commercial Community of Ceylon took advantage of the unique opportunity placed at their disposal by the Indian Committee for an effective advertisement of the products of the Island; and (*c*) to the strenuous exertions of the Royal Commissioners, Sir Montague Ommanney and Sir Cecil C Smith, aided in Paris by the untiring zeal of Mr W E Davidson, the Executive Secretary of the Ceylon Section, and Sir William Mitchell and Mr J H Renton, the Commercial representatives of Ceylon.

The cost of the Ceylon Courts was about £16,500, of which £2,000 was paid by the Ceylon Planters' Association and the remainder by the Government.

THE BRITISH INDIAN TEA COURT.

HOW THE WORK WAS DONE.

48 Rue du Faubourg St. Honoré, Paris, Nov. 29th, 1900.

I am in great hopes that this my final report of work done at the exhibition will satisfactorily show the Committee that the prospects of Indian Tea in France are brighter now, even than they were when I wrote on the subject in September last, and that the Association will feel how justified they were in deciding to continue a business which has commenced so well.

As the sale of tea in the cup was chiefly intended to serve as a means to popularise Indian tea in France, the Association will be pleased to note what progress was made in

THE SALE OF PACKET TEA,

At their stall in the exhibition which was opened on 13th June, the sales increased, *pari passu* in a manner which I think the Committee will consider highly satisfactory. A tabular statement will be given at end of this report. It will show that to date over 8,000 lb. tea have been sold.

The liking for Indian tea undeniably increased during the run of the exhibition, but the increase of sales for the last few days is partly to be accounted for by the fact that purchasers had formed the idea that when the exhibition closed the price of tea would be raised. This opinion was held by the trade, but that such will not be the case is now fast becoming evident to all, and our hopes, therefore, are that we shall not lose much ground by reason of the exhibition now being closed. That the low price can and will be maintained is, of course, in consequence of the support we have received, and are to continue to receive, from the Association, and which I venture to say is of far better form than that of subsidising grocers, with whom, however, we shall have to reckon later on when Indian tea is more generally inquired for in France. Up to the present we have not been able to do very much with the trade itself, for the reason that our price does not permit us to give a discount anything approaching the customary one in France—viz., 25 per cent—but our hopes are that the present trade price may be modified if we can buy our tea through more direct channels than we do now.

INFUSION.

Owing, as I have already said, to their somewhat unexpected secluded situation, the "Indian Tea Courts" were not easily found by many chance visitors, or by those who came especially to visit them, but once they were found they became the resort of the best society, members of which have been known to say that the Indian Tea Courts were the most *chic* of any in the Exhibition. Although in such "rushes" of business as occurred in the Tea Courts it was utterly impossible to give entire satisfaction to every one, the complaints were very few indeed, and of rather a hypercritical kind. On the other hand I am happy and content to mention that unstinted and warm praise was given by the *habitués* of the Courts, notably the Princess Malakoff (who for nine days took her seat regularly at four o'clock), the Duchess of Mecklenburg, Baron and Baroness Alphonse Rothschild, and the French Commissary-General. The Baron and Baroness were pleased to say that the Grand Prix should have been awarded the Association for the manner in which the tea was served, as well as for the goodness of the tea itself.

THE PRETTY BOXES OF SAMPLES

were much appreciated by all visitors, and happily by the French in particular. About 20,000 sample boxes were given away during the exhibition, and the balance of our stock will be distributed in connection with the work to be continued at the Rue du Faubourg St. Honoré and Rue d'Alger.

* * * *

TO REVERT TO TEA.

By a calculation of mine that on an average no one person ordered less than 75 *centimes*' worth of tea in the cup, the 69,500 francs receipts represent 96,400 pots of tea (two cups in each); but that number is considerably under-estimated because so many people often ordered pots of tea for a smaller number than their party consisted of, and also extra cups for the rest. Tea for two and cups for three, four and five, was an order frequently executed. As also hot water in addition was served, sufficient for another two cups, the quantity of tea drunk by each person was, of course, much increased. I have not taken that into my calculations but only the number of pots of tea served. Putting it, however, at a reasonably low figure, I believe that not less than 50 to 60 people were every day served with extra cups without having to pay anything except a penny for the accommodation. At this rate, in the 210 days of the Exhibition 10,000 cups of tea can be added to the 96,400 pots accounted for. The

FRENCH DO NOT ALWAYS TAKE THEIR TEA AS THE ENGLISH DO,

but they persevere in their attempt and evidently wish to like the beverage. Some, more often than not, dip their bread and butter and even cake into the cup of tea they are drinking, and some novices seemed to consider the tea was a kind of grog to be mixed with the hot water, which they poured into the cup first. Others poured the tea into the sugar basin, half the contents of which they had previously eaten and then into the hot water jug and from that into the cup. Or, for another change, they would partially empty the milk jug and then pour the tea into that. Our American visitors liked a glass of iced water to drink either with their tea or after it. I do not mention these little peculiarities for the purpose of ridicule, but rather to show that tea-drinking in France is yet very much in its infancy.

THE EXPERT

was, of course, sometimes present in the Tea Courts, judging from the procedure of some of the visitors, who, to the great wonderment of the foreign waitresses, would turn the leaves out into the saucer or plate, examine them closely and then turn them back into the tea pot, and, having added more water, drink another cup of tea. [Here comes the portion we have already quoted specially criticising Ceylon methods to secure public attention, to which we have directed the notice of the "Thirty Committee" and Mr. Renton.—Ed. *T. A.*]

The exhibit of Tea in the Commercial Court attracted much attention, more particularly so as the tea sales stall was close to two of the show

cases. The light, however, was not good, and although, with the object of showing up the tea better, I did not fill the globes more than three-quarters full, the exhibit at certain hours of the day was not so effective as could be desired. I may mention that the exhibit of very fine tip from some of the gardens, apart from all other merits, was most useful, in that many of the purchasers of our packets became disabused of the idea that tea with tip in it was not good, but contained some foreign matter. I do not know if it is within my province to allude to

THE "JUDGING,"

for, of course, the reputation of the gentlemen appointed by the British Commissioners as jurors is undisputed; but I may, I hope, without presumption, ask to be permitted to say that no one could have taken more pains than Mr Wilson did to have the tea properly judged and the awards fairly given. All the samples, more than R400, which were in the show cases were carefully examined in the leaf by all the jurors of class 59, who, however, not being experts in tea, often deferred their opinion to Mr Wilson and that of Mr Dérode, the French expert, on the jury, and I would particularly mention how hard Mr Wilson fought to have awards given to individual gardens independently of the Grand Prix which was to be awarded to the Indian Tea Association for the collective exhibit and how, too, he won his point in spite of very great opposition offered seemingly only on technical grounds.

The gold medal for coffee was, by a clerical error, first of all awarded to Ceylon, but was ultimately given to the United Planters' Association of Southern India, after repeated and strenuous representations on my part. Summary of quantity and value of Tea in packets sold at the Exhibition and at Depôt, 3 Rue d'Alger, Paris :—

	K.	Frs.
From 17th to 30th April at Depôt	13.125 ...	90.40
For May do	3.890 ..	737.60
For June at Exhibition & do	88.010 ..	2,704.60
For July do do	483.600 ..	3,354.10
For August do do	492.375 ..	3,208.60
For September do do	673.750 ...	4,642.85
For October do do	1,021.575 ...	7,117.25
For November (approximately) at Exhibiton and Depôt	1,000.000 ..	6,600.00
	4,187.325 ..	28,455.40

(Equals 8,364 English lb.)

(Signed) EDWARD F. LANGDALE.

THE GOOMERA (CEYLON) TEA ESTATES COMPANY, LIMITED.

REPORT OF THE DIRECTORS.

The directors beg to submit herewith their seventh annual report and balance sheet for the year ending 30th June, 1901.

The accounts after paying debenture interest and London expenses, show a loss of £2,205 12s which amount after deducting the credit balance of £29 16s 2d brought forward from last year leaves a loss of £2,175 15s 10d to be carried forward.

The total crop from the Company's estates amounted to 245,313 lb. realising a net average of 4·13d per lb. against 223,758 lb. harvested from the Company's estates last year, which realised net average 5·27d

During the past year the system of high cultivation advocated by Mr Joseph Fraser and mentioned in last year's report, has been entered upon by the Directors. The result of this expenditure have not shown themselves to the extent that was hoped during the past season, the figures for which, including as they do all manuring expenditure, show a very heavy loss. It is believed that the present season will show the effect of the money that has been spent, and the directors consider that, in face of the present and past conditions of the tea market, the only hope for the Company is by a continuance of a policy of liberal cultivation.

The Directors have not drawn their fees for the year, and propose waiving them.

During the year, Mr. B F White, who was re-elected as a director at the last general meeting, resigned his seat in favour of Mr. F E Cobb, a large shareholder in the Company, who was so kind as to accept a seat on the board.

Mr. A V Holland retires in accordance with the articles of Association, and being eligible, offers himself for re-election.

The auditor, Mr. J D Stewart Bogle, C.A., retires, and offers himself for re-election.

THE LANKA PLANTATIONS COMPANY, LIMITED.

REPORT.

Presented at the twenty-first ordinary annual general meeting of the Lanka Plantations Company Limited, held at the offices of the Company on Wednesday the 13th November, 1901, at twelve o'clock noon precisely,

1. The Directors now submit their report for the twelve months ending 30th June last, together with the Balance Sheet and Accounts of the Company made up to that date and duly audited.

2. The Coffee crop amounted to 139 cwts. 0 qrs. 17 lb, and realised £490 12s 5d. Last year the crop was 174 cwts. 3 qrs. 13 lb, and realised £573 8s 5d. The cultivation of this product being no longer remunerative has ceased, but there will be a little crop for a year or two from the trees that remain among the Tea.

3. The total crop of Cocoa gathered on Yattawatte amounted to 1,026 cwts., and realised £3,610 3s 10d, against 1,099 cwts. last year, which realised £5,121 8s 5d. The expenditure on clearings not yet in bearing is charged to Capital Account. On the same Estate 310 lb of Cardamoms were gathered, realising £19 2s 10d.

4. The total yield of Tea was 974.511 lb plucked off 2,164 acres, being at the rate of 450 lb. an acre and realised £26,979 17s 2d the average being 6 64d. per lb. net. Last year the crop amounted to 947,194 lb. which realised £27,566 4s 7d the average being 6·98d per lb. net

5. The average rate at which drafts were negotiated on account of the season's crops was 1/4 3·8 per Rupee against 1/4½ last year.

6. The following Statement shows the approximate acreage and state of cultivation of the Company's Estates on the 30th June last, as per recent surveys :—

Estate.	Coffee.	Tea.	Cocoa.	Grass.	Chena and Patanas & Waste.	Forest and Timber Trees.	Total.
Ampittiakande	..	291	...	4	..	70	365
Arnhall	..	174	..	..	255	..	429
Fruit Hill	..	227	..	..	10	...	237
Fordyce, Garbawn, Gonagalla & Paramatta		798	..	5	..	135	938
Rappahannock	...	322	..	31	30	90	473
Rillamulle	..	195	..	...	343	22	560
Thotulagalla	55	327	..	..	60	114	556
Yattawatte	...	...	751	95	312	82	1,240
	55	2,334	751	135	1,010	513	4,793

7. The Net Profits of the past year amounted at £5,115 3s 1d, to which must be added the sum of £614 18s 9d. the balance brought forward from the year 1899-1900 making together £5,730 1s 10d.

8. Having already paid a half years' interim dividend on the 6 per cent Preference Shares to the 31st December, 1900, amounting (less property tax) to £418 19s 0d, the Directors recommend the payment of the dividend on these shares to 30th June last, requiring (less property tax) £417 2s 3d, and they further recommend a dividend of 5s per share (free of income tax), being 2½ per cent on the ordinary shares, amounting to £3,750 carrying forward the balance of £1,144 0s 7d to next account. The Directors do not consider it necessary to make any deduction from the Suspense Account this year, as they deducted last year in anticipation £999 4s 5d, being one-tenth of the sums charged to this account during the ten years ending 30th June, 1900.

9. Mr. Henry Bois, the Director retiring on this occasion, being eligible, offers himself for re-election.

Mr. John Smith, the Auditor also retires, and being a shareholder offers himself for re-election.—By order of the Board,

C. M. ROBERTSON, Secretary.

12, Fenchurch St., London, E.C., 1st Nov., 1901.

THE YATIYANTOTA, CEYLON TEA COMPANY, LIMITED.

27, Mincing Lane, London, E. C., 29th October, 1901.

To the Shareholders.

DEAR SIR (or MADAM),—An Interim Dividend of 3 per cent. for 1901 on the Preference Shares was declared and paid, as usual, on 1st July last, but the Directors regret to announce that the working of the Company for the first half of this year does not admit of the payment of an Interim Dividend on the Ordinary Shares, as is usual at this time.

At the annual general meeting of the Company, held on 25th April last, the Chairman referred to the movement then under the consideration of producers, having for its object a curtailment in the output of tea, in order to meet the adverse position caused by the then existing accumulation of stocks and serious depression in prices. Although concerted action was found impossible, growers generally have taken steps to lessen their production, with the result that the excessive stocks have been absorbed, and market prices have lately shown appreciable improvement.

The latest advices from Ceylon indicate that, consequent upon the alteration in the method of working adopted this year, the crops from the Company's estates will show a falling off of 10 to 12 per cent on the quantity produced last year, and that the cost of production, per pound of tea, is likely to be about three-eighths of a penny higher than it was in 1900. The net average price obtained for the first half-year's production, however, shows but a very trifling advance on the average secured for the whole of last year's crops, notwithstanding a marked improvement in quality, resulting from the higher character of the leaf plucked. The margin of profit for the half-year has thus been reduced to about three farthings per pound of tea, which does little more than meet the Preference Dividend, after making the usual provision for depreciation, &c.

Present market prices, however, show fully a penny per pound advance on last season's average, and if this improvement should continue until the balance of the current crops has been sold, the net profit on the years' working will, in all probability, equal that of last year.

The Directors desire to take this opportunity of informing the Shareholders that Mr. Walter J Smith, having assumed charge of the working of part of the Company's property, has resigned his seat on the Board as at 30th September. The Directors have appointed Mr. John McInnes Skinner to fill the casual vacancy thus created.—I am, dear sir (or madam), yours faithfully, T. A. WILLIAMS, Secretary.

CENTRAL TEA CO. OF CEYLON, LD.

Report of the directors submitted at the sixth Annual Ordinary General Meeting of shareholders held at 20, Eastcheap, E.C., on Monday, the 18th November, 1901.

The directors beg to submit the general balance sheet and profit and loss account for the year ending 30th June 1900, duly audited.

	£ s d	£ s d
The net amount at credit of profit and loss account including the balance brought forward at 30th June 1900, and after providing for general expenses, directors' fees, income tax, etc., is		1,885 1 9
Dividends on the 6 per cent preference shares were paid for 1900/1901 to 30th June (less income tax) amounting to ..	960 9 4	
The 1½ per cent unpaid on the preference shares at 30th June (less income tax) has since been paid amounting to	317 16 3	
It is proposed to write off for depreciation	300 0 0	
And to carry forward to next year a balance of	306 16 2	
		1,885 1 9

Owing to the heavy fall in the market price of tea and a diminished yield the directors regret the results for the past year have been disappointing.

The gross average price realised for the tea was 6.55d per lb, as against 7.03d per lb last season, and the rate of exchange was 1s 4 13-32d as against 1s 4-31-64d.

The yield of tea was 374,383 lb, being 418 lb per acre over a plucking area of 895 acres.

The increase of expenditure under the head of Cost of Estates during the past year is due principally to necessary additions to machinery for Somerset; and for an installation of an aerial tramway; factory extension; and cart road for Kabragalla. These works have all been made with a view to reducing the cost of production.

The vendor having surrendered the 400 ordinary shares allotted but not issued, the agreement and the allotment for the same have been cancelled.

The current year has opened with better prospects for tea, and encouraging reports have been received as to the future of the acreage under cardamoms.

Under clause 24 of the Articles of Association, Mr. W H Anderson retires on this occasion from the Board, and being eligible, offers himself for re-election.

The auditors, Messrs. Harper Brothers, Chartered Accountants, also retire from office, and offer themselves for re-election.

By order of the Board, WM. JOHNSTON, Secretary.
London, Nov. 8th.

THE CEYLON LAND AND PRODUCE COMPANY, LTD.

Report of the Directors, submitted to the seventeenth annual general meeting of shareholders held at the Registered Office of the Company, Nos. 353 and 354, Leadenhall House, 101, Leadenhall Street, in the City of London, on Friday, the 15th day of November, 1901, at 2 o'clock p.m.

Your directors have the pleasure to submit the annexed Profit and Loss Account and Balance Sheet for the Crop year ending 30th June 1901, duly audited.

The amount at credit of Profit and Loss Account is £6,533 18s 11d which with the sum of £745 11s 7d brought forward from last year, leaves £7,279 10s 6d to be distributed.

On the 22nd July last an Interim Dividend of 7½ per cent on the Ordinary Shares and 3 per cent on the Preference Shares was paid, and your Directors now propose to pay on the 14th day of December 1901, the balance of the fixed Cumulative Dividend on the Preference Shares (3 per cent) making 6 per cent for the year, 7½ per cent on the Ordinary Shares making 15 per cent for the year, all free of Income Tax. It is also proposed to set aside the sum of £100 as a provision for possible losses on Coast Advance Account, and carry forward the balance of £1,172 12s 6d subject to the Directors' remuneration for the year under review and to the payment of Income Tax, &c.

A sum of £1,693 17s 6d spent upon permanent improvements during the year has been debited to Revenue.

In accordance with a resolution of the Board, a call of 10s. per share was made upon all the members, holding preference shares upon which only £4 had been paid, and the same was payable on the 1st July last. Your Directors take this opportunity of pointing out that the security of the debenture-holders is thereby increased, as the borrowing powers of the Board on debenture are restricted to the amount of the subscribed but uncalled share capital at the time of such borrowing.

Your Directors have to report that the total crop of tea from the Company's estates for the year fell short of the estimates by 28,462 lb., but on the other hand, there were increases of 79,167 lb. made from purchased leaf, and of 138,935 lb, made for others, the total excess amounting to 189,640 lb. It is regrettable, however, that the net average price secured has fallen from 6·21d to 5·28d per lb; during the currency of the season the mean rate of exchange has receded from 1s 4½d to 1s 43-8d, whilst freights have also shown a lower tendency as compared with the previous financial year.

Your Board specially wish to inform the members that no expense has been spared to bring the Company's estates into the best possible state of cultivation even in face of the low prices that have prevailed: not only has extensive manuring been done, but in every case where tea bushes were cut down they were lightly plucked for six months, and in consequence, the Company's Manager in Ceylon reports that each estate shows improvement in the cover of tea.

Your Directors are of opinion that the important work of manuring should be continued judiciously year by year, not in order to increase the yield, but principally to give nourishment to the bushes and keep up their strength and vigour, with the result that they will be better able to resist blight, which has not been at all prevalent during the past year.

A total sum of R31,350 (£2,138 19s 8d) has been expended on manuring Tea and Cocoa during the season, the whole of which has been debited to Revenue account.

The cocoa crop totalled 2,378 cwt, against an estimate of 2,165 cwt.

Your Directors have to report that the greatest precautions continue to be taken to keep cocoa disease in hand, gangs of coolies being frequently employed in searching for and treating canker, in accordance with the advice given by the Government Mycologist. The opinion is generally held, by those competent to judge, that this disease can be kept down, by continuous care and attention, to a point when the resultant loss from it is not serious; your Directors concur in this view, and think that canker will be a great obstacle to the successful cultivation of cocoa; indeed, the probability is that it may be eradicated.

A census of coconut trees was taken on or about 30th June last, shewing a total number of 46,709 growing amongst other products; this is equal to over 600 acres, at the rate of 76 trees per acre. Your Directors are pleased with the progress made with this cultivation, and believe that in the course of time it will be a valuable asset.

A tea factory has been erected on Strathisla Estate and is working well. A satisfactory contract has been entered into, to manufacture the total output from a neighbouring Estate for a term of years.

Two bungalows, situated on New Peradeniya and the grounds pertaining thereto, have been disposed of at good prices and proceeds applied to the reduction of the Estate's Capital Account.

Your Directors have purchased from natives 18½ acres of land within the boundaries of North Matale Estate, of which 12 acres were under cocoa in full bearing.

Tea.—This industry has passed through a very trying time since the issue of last report and balance sheet. Owing to favourable weather, heavy flushes of leaf were experienced generally throughout the Island, and many growers, encouraged by the high prices ruling here for common kinds during the first half of 1900, were induced to take advantage of the situation and pluck somewhat coarsely. The market was consequently overburdened with supplies of inferior quality and the inevitable reaction set in, resulting in a serious drop in the value of most grades. The anticipation of a possible rise in duty also led buyers to make clearances largely in advance of immediate requirements and hampered their purchasing power. Fortunately the seriousness of the position was realised, and successful efforts were made by more careful plucking and manufacture to remedy the state of affairs, and this, combined with climatic influences more favourable to a smaller and better crop resulted in a curtailment of shipments and improved quality, which has gradually brought about a more healthy condition of the industry. Unpleasant as the experience has been to all interested it has perhaps not proved an unmixed evil, as Ceylon tea, on account of its cheapness, was used more freely than before, both at home and abroad, and it is to be hoped that the taste for the article once implanted may be fostered by the more careful cultivation and manufacture now bestowed upon it.

From 1st January to 31st ult. 1,053,000 packages of estate tea passed through the Mincing Lane Sale Room realising 6¾d per lb against 7¼d per lb for 100,700 packages, and 8d per lb for 964,500 packages in the corresponding ten months of the two preceding years. The lowest point of the market was touched in February, the average for that month being 6½d per lb whereas for October it was 8d per lb.

During the first nine months of this year to 30th September Exports to Foreign Markets from London were:—r

1901.	1900.	1899.
13,305,000 lb	10,279,000 lb	8,913,000 lb.

In the same period shipments from Ceylon to the undermentioned countries were:—

1901.	1900.	1899.
To Australasia.		
15,669,000 lb	12,894,000 lb	11,967,000 lb.
To Russia.		
6,977,000 lb	6,657,000 lb	2,719,000 lb.
To America.		
2,692,000 lb	3,463,000 lb	2,344,000 lb.

Cocoa.—The Market has been disappointing. At the commencement of the season there was a good general demand with an improvement in prices but as the season developed and arrivals were plentiful and continuous, the demand suddenly subsided and prices became almost nominal business assuming a retail character, with accumulating stocks. Holders generally adopted a firm attitude for some time, awaiting the resumption of demand, but this being too prolonged, pressure to sell became manifest, and a break in prices was the result. The statistical position of the article is satisfactory, consumption in nearly all countries shewing an encouraging increase. The quality generally has been inferior, with only a few really attractive lots, which are mostly firmly held

Acreages.—The following statement shows the ap-

proximate pro acreage of the Company's properties at date :—

Name of Estate.	Tea. 2 yrs.	3 yrs.	Over 3 yrs.	Cocoa. Bearing.	Not bearing.	Cocoa, coffee, &c.	Forest, grass, chena, abandoned, &c.	Total acreage.
Allo wiharie group	..		214½	319	28	116¼	15	692¾
Andangodde estate	..		176¼	..	..	..	...	176¼
Fetteresso estate	5	..	405	..	...	...	28	438
New Peradeniya estate		..	386*a*	18	..	...	50½	454½
North Matale group		18	389	733	10	85	360	1,595
Owella estate	..	..	..	47	171*b*	..	239	457
Rickarton estate	2	..	538	..	..	...	56	596
Strathisla group	39½	58	162	167*b*	7	...	5¼	438¾
Forest land	..	..	...	..	...	..	430	430
	46½	76	2,270¾	1,284	216	201¼	1,183¾	5,278¼
	2,393¼			1,500				

a And cocoa. *b* And tea.

N.B.—In the absence of detailed surveys these figures, as mentioned above, are approximate only.

The Estimates for current year provide for a Crop of 1,069,750 lb tea from the Company's Estates, 80,000 lb from bought leaf, and 295,000 lb made for others, or a total of 1,444,750 lb, as compared with the aggregate of 1,400,140 lb secured in 1900-1901. The crop of cocoa is estimated to be 2,325 cwt. Owing to unfavourable weather and finer plucking, the total in take of tea at date of last reports was somewhat less than at same time last year. It is hoped that the cocoa estimates may be realised, but at the moment your Directors cannot speak with any certainty ; with favourable weather the estimates should be secured.

It may be interesting to note that income tax now amounts to over 11 per cent of the full dividends for last year.

Mr Alex. D Wilson, by rotation retires from the Directorate, but being eligible, offers himself for re-election.

Mr James B Laurie, the Auditor, also retires, but he is eligible, and offers himself for re-election.—By Order of the Board, JAMES WILSON, Chairman ; ALFRED E LOCK, Secretary.

Leadenhall House, 101, Leadenhall Street, London, E C, 6th November, 1901.

STATISTICS FOR PAST 12 YEARS.

TEA.

Year ending 30th June.	Acres of Tea in bearing.	Crop, lb.	Average per acre, lb.	Teas made for others, & from purchased Leaf, lb.	Net Average per lb, realised for all Tea sold in London.	Rate of Exchange. s d	Rupee Cents.
1890	1131	351,842	314	286,292	9·46d	1 5½	54·06
1891	1345	480,684	358	357,648	9·10d	1 6	48·61
1892	1385	503,293	364	479,0 5	7·81d	1 4¾	46 63
1893	1406	589,192	419	528,172	7·70d	1 3	51·33
1994	1451	608,110	419	342,040	6 77d	1 2½	46·68
1995	1556	597,399	384	435,908	7 34d	1 1¼	55·40
1996	1556	694,720	446	590,111	6·80d	1 2	48·57
1997	1571	748,994	476	432,652	6·51d	1 3	43·40
1998	1636	753,151	460	393,360	6·22d / 6·27d*a*	1 4	38·88 / 39·19*a*
1999	1754	754,768	430	281,457	6·75d / 6·78d*a*	1 4¼	41·54 / 41·72*a*
1900	1814	865,768	477	406,327	6·19d / 6·21d*a*	1 4½	37 51 / 37·64*a*
1901	2108	917,038	435	483,102	5·24d / 5·28d*a*	1 4⅜	32·00 / 32·24*a*

a Including Sales made in Colombo.

Year ending 30th June.	COCOA. Crop, cwts.	Net Average per cwt. s.	d.	Highest price realised. s.	d.	DIVIDENDS. Preference per cent.	Ordinary per cent.
1890	1224	95	11	115	0	6	10
1891	1355	108	0	129	6	6	10
1892	1431	96	5	120	0	6	15
1893	2201	90	11	130	9	6	15*a*
1894	1212	58	4	83	0	6	15
1895	2840	52	9	65	6	6	15*a*
1896	2335	56	8	80	0	6	15*a*
1897	2266	66	1	85	0	6	15*a*
1898	2523	68	3	80	0	6	15*a*
1899	2594	66	3	86	0	6	15*a*
1900	1574	78	0	102	6	6	15
1901	2378	76	8*b*	103	6	6	15

b Estimated. *a* And 5 per cent. Bonus.

THE CENTRAL PROVINCE CEYLON TEA COMPANY, LTD.

REPORT OF THE DIRECTORS.

Submitted to the shareholders at their fifth annual ordinary general meeting, held in the Council Room, London Chamber of Commerce, Botolph House, Eastcheap, E.C., on Monday, the 4th November, 1901.

The Directors beg to submit to the shareholders the audited accounts for the year ending 30th June, 1901.

The total crop of tea from the estates for the past season was 809,858 lb, against 843,388 lb, of the preceding year, being a decrease of 33,530 lb a great part of this reduction being caused by finer plucking.

The total sales, including bought tea, were 1,058 083 lb, averaging 5·341d. per lb net, being ·342d. less than last year, equal to a loss of profit on the estate crop of over £1,000 by the fall in price alone.

As regards cocoa, the crop amounted to 521 cwt, against 315 cwt last year, the average price being 66s. 10d. per cwt as against 66s. 9d. Small consignments of minor products have been received, showing a profit of about £300, mostly from pepper.

There were during the season 194 acres of tea not yet in full bearing.

The rate of exchange, averaged 1s 4·21d per rupee as against 1s 4·3d last season.

The net profits for the year amount to £3,036 2s 5d after writing off £200 from estates account for depreciation of machinery, which with £1,723 6s 9d brought forward from last year, shows a sum of £4,759 9s 2d to be dealt with. Of this amount £1,500 has been applied to the payment of an interim dividend at the rate of 6 per cent per annum on the preference shares to 31st December, 1900. The Directors now recommend a dividend of 6 per cent per annum on the preference shares to 30th June, 1901, absorbing £1 500 and leaving £1,759 9s 2d to be carried forward to next account.

Mr. S R Pryor is the Director retiring by rotation, and, being eligible, offers himself for re-election.

Messrs. Fuller, Wise and Fisher, Chartered Accountants, offer themselves for re-election as Auditors.

THE DEAF HEAR.—No. 479 of *the Illustrated World* of 626, Chiswick High Road, London, W., England contains a description of a remarkable Cure for Deafness and Head Noises which may be carried out at the patient's home, and which is said to be a certain cure. This number will be sent free to any deaf persons sending their address to the Editor.

SHARE LIST.

ISSUED BY THE

COLOMBO SHARE BROKERS' ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Company	paid p. sh.	Buyers.	Sellers.	Transaction
Agra Ouvah Estates Co., Ltd.	500	875	900	—
Ceylon Tea and Coconut Estates	500	—	—	..
Castlereagh Tea Co., Ltd.	100	—	75	—
Ceylon Provincial Estates Co. Ltd.	500	—	—	500
Claremont Estates Co., Ltd.	100	—	—	—
Clunes Tea Co., Ltd.	100	—	50	—
Clyde Estates Co., Ltd.	100	—	—	..
Doomoo Tea Co., of Ceylon Ltd.	100	—	—	—
Drayton Estate Co., Ltd.	100	...	...	...
Eila Tea Co., of Ceylon, Ltd.	100	—	30	—
Estates Co of Uva, Ltd.	500	..	210	—
Gangawatta	950	—	—	..
Glasgow Estate Co., Ltd.	500	—	950	—
Great Western Tea Co., Ltd.	500	610	—	—
Hapugahalande Tea Estate Co.	200	—	—	..
High Forests Estates Co., Ltd	500	...	550	..
Do part paid	400	—	450	—
Horekelly Estates Co., Ltd.	100	—	85	—
Kalutara Co., Ltd.	500	—	250	—
Kandyan Hills Co., Ltd.	100	—	40	—
Kanapediwatte Ltd.	100	—	85	—
Kelani Tea Garden Co., Ltd.	100	—	—	—
Kirklees Estates Co., Ltd.	100	—	120	...
Knavesmire Estates Co., Ltd.	100	—	55	—
Maha Uva Estates Co., Ltd	500	—	400	..
Mocha Tea Co., of Ceylon, Ltd.	500	700	—	—
Nahavilla Estate Co., Ltd.	500	—	300	...
Neboda Tea., Co. Ltd	500	..	500	—
Palmerston Tea Co., Ltd.	500	—	400	—
Penrhos Estates Co., Ltd.	100	—	90	—
Pitakanda Tea Company	500	—	—	—
Pine Hill Estate Co., Ltd.	60	35	40	—
Putupaula Tea Co., Ltd.	100	—	—	..
Ratwatte Cocoa Co., Ltd.	500	—	250	—
Rayigam Tea Co. Ltd.	100	—	40	...
Roeberry Tea Co., Ltd.	100	70	—	—
Ruanwella Tea Co., Ltd.	100	...	35	
St. Helier's Tea Co., Ltd.	500	—	500	...
Talgaswela Tea Co., Ltd.	100	—	27·50	...
Do 7 per cent Prefs.	100	..	70	...
Tonacombe Estate Co., Ltd.	500	—	..	...
Udugama Tea & Timber Co., Ltd.	50	..	..	...
Union Estate Co., Ltd.	500	...	150	..
Upper Maskeliya Estates Co. Ltd.	500	—	425	..
Uvakellie Tea Co., of Ceylon, Ltd.	100	—	—	—
Vogan Tea Co., Ltd.	100	..	55	55
WanarajahTea Co.,Ltd.	500	..	1000	—
Yatadeniya Tea Co., Ltd.	100	250	300	—

CEYLON COMMERCIAL COMPANIES.

Company	paid p. sh.	Buyers.	Sellers.	Transaction
Adam's Peak Hotel Co., Ltd.	100	...	30	—
Bristol Hotel Co., Ltd.	100	—	—	—
Do 7 per cent Debts	100	105	—	—
Ceylon Gen. Steam Navgtn. Co., Ltd	100	—	—	..
Ceylon Superaeration Ltd.	100	137·50	...	137 50
Colombo Apothecaries' Co. Ltd.	100	$137\frac{1}{2}$	—	$137\frac{1}{2}$
Colombo Assembly Rooms Co., Ltd.	20	15	..	...
Do prefs.	20	...	..	—
Colombo Fort Land and Building Co., Ltd.	100	—	90	—
Colombo Hotels Company	100	295	$297\frac{1}{2}$	$197\frac{1}{2}$
Galle Face Hotel Co., Ltd.	100	172·50	—	—
Kandy Hotels Co., Ltd.	100	..	$112\frac{1}{2}$	—
Mount Lavinia Hotel Co., Ltd.	500	250	350	—
New Colombo Ice Co., Ltd.	100	...	180	—
Nuwara Eliya Hotels Co., Ltd.	30	30	—	..
Do 7 per cent prefs.	100	100	107	...
Public Hall Co., Ltd.	20	$12\frac{1}{2}$	14	...

LONDON COMPANIES.

Company	paid p. sh.	Buyers.	Sellers.	Transaction
Alliance Tea Co., of Ceylon, Ltd.	10	...	8—9	..
Anglo-Ceylon General Estates Co.	100	..	55—60	..
Associated Estates Co., of Ceylon	10	—	$1\frac{1}{2}$—$2\frac{1}{2}$	...
Do. 6 per cent prefs.	10	..	3—5	..
Ceylon Proprietary Co.	1	...	$\frac{1}{4}$—$\frac{1}{2}$	..
Ceylon Tea Plantation Co., Ltd.	10	..	$23\frac{1}{4}$—24	..
Dimbula Valley Co., Ltd.	5	..	5—$5\frac{1}{4}$	..
Do prefs.	5	..	5 - 6	...
Eastern Produce & Estates Co. Ltd.	5	$3\frac{1}{4}$	$3\frac{1}{4}$--$3\frac{3}{4}$	..
Ederapolla Tea Co., Ltd.	10	...	6—8	...
Imperial Tea Estates Co., Ltd.	10	4	4—$4\frac{1}{2}$	—
Kelani Valley Tea Assen., Ltd.	5	..	3—5	...
Kintyre Estates Co., Ltd.	10	...	6—8	..
Lanka Plantation Co., Ltd.	10	..	$3\frac{1}{2}$—$4\frac{1}{2}$	..
Nahalma Estates Co.,Ltd.	1	—	nom	..
New Dimbula Co., Ltd.	1	...	$2\frac{3}{4}$—3	..
Nuwara Eliya Tea Estate Co., Ld.	10	—	10	..
Ouvah Coffee Co., Ltd.	10	..	6—7	...
Ragalla Tea Estates Co., Ltd.	10	..	11 - 13	..
Scottish Ceylon Tea Co.,Ltd.	10	—	10—15	...
Spring Valley Tea Co., Ltd.	10	...	2—5	..
Standard Tea Co., Ltd.	6	..	10—12	...
The Shell Transport and Trading Company, Ltd.	1		$2\frac{7}{8}$—$3\frac{1}{8}$	...
Ukuwella Estates Co., Ltd.	25	—	par	..
Yatiyantota Ceylon Tea Co., Ltd.	10	$4\frac{3}{4}$	$4\frac{1}{2}$—5	
Do. pref. 6 o/o	10	...	9—10	

BY ORDER OF THE COMMITTEE

Colombo, Dec. 6th, 1901.

* Latest Lonndo Prices.

RAINFALL RETURN FOR COLOMBO.

(*Supplied by the Surveyor-General.*)

	1896.	1897.	1898.	1899.	1900	Av of 31yrs.	1901
	Inch	Inch	Inch	Inch.	Inch.	Inch.	Inch.
January ..	2·92	3·81	2·32	6·98	3·72	3·24	11·91
February ..	0·35	1·63	1·98	2·78	0·63	1·89	3·55
March ..	5·64	3·66	4·21	0·88	3·71	4·75	5·12
April ..	5·93	10·97	22·81	6·66	15·12	11·43	8·71
May ..	9·31	8·30	5·80	17·73	10 63	12·04	6·28
June ..	8·37	10·14	10·94	9·23	7·83	8·35	5·93
July	2·85	5·24	6·15	1·11	6·77	4·30	4·52
August ..	6·35	9·09	0·97	0·62	7·35	3·79	0·46
September	10·99	4·58	6·90	1·48	4·00	4·98	3·93
October ..	16·78	4·71	20·60	12 99	9·47	14·36	3 91
November..	19.81	11·66	17·38	8·58	9·25	12·55	19·84
December..	11·76	8·89	3·05	4·44	5·20	6·35	0·08*
Total..	101·06	82·73	103·11	73·48	83·68	88·03	74·24

* From 1st to 4th Dec. 0·08 inch, that is up to 9·30 a.m. on the 5th Dec.—ED. *C.O.*

BARK STRIPPING.—A short time since some strips of Larch-bark were sent to us, with a request for information. The rectangular strips were 1 or 2 inches long, quarter to half an inch wide, very regular and straight-edged. Squirrels were at once thought of, but we had never seen an injury of this kind effected by these animals, nor had the numbers of the Scientific Committee, to whom they were submitted. Nuthatches were suggested, but now the culprits have been seen at work, and turn out to be as at first suspected—squirrels. Mr. Rothery, gr. to O. O. Wrigley Esq., Wansfell, Windermere, writes :—"The speed with which they can tear off the bark would greatly astonish anyone. They have destroyed about 350 trees, ranging from 25 to 35 feet high, and some of them are stripped 7 and 8 feet down, and the whole of them appear to have been attacked some 5 feet from the top. Their object is no doubt food, for they scrape off the gultinons substance between the bark and the wood.—*Gardeners' Chronicle.*

COLOMBO PRICE CURRENT.

(Furnished by the Chamberof Commerce.)

EXPORTS

Colombo, Dec 2nd, 1901.

CARDAMOMS :—
All round parcel, well bleached per lb. R1·55
Do. dull medium do. R1·40
Special assortment, 0 and 1 only do. R1·90
Seeds do. R1·40

CINCHONA BARK :—
Per unit of Sulphate of Quinine 10c—1½ to 3 o/o

CINNAMON :—
Ordinary assortment per lb. 53c.
Nos. 1 and 2 only per lb. 59c.
Nos. 3 and 4 only per lb. 48c.

CINNAMON CHIPS :—
Per candy of 560 lb R77·50

COCOA :—
Finest estate red; unpicked per cwt R49·00
Medium do do do R45·00
Bright native unpicked and undried R43 00
Ordinary do do do R40·00

COCONUTS—(husked).
Selected per thousand R54·00
Ordinary „ R47·00
Smalls „ R38·00

COCONUT CAKE—
Poonac in robins f. o. b. per ton R75·00
Do in bags None

COCONUT (Desiccated).
Assorted all grades per lb 18c

COCONUT OIL—
Dealers' Oil per cwt R17·75.
Coconut Oil in ordinary packages f. o. b. per ton R390·00. The lower price for distant shipment.

COFFEE.—
Plantation Estate Parchment on the spot per bus. None.
Plantation Estate Coffee f.o.b. (ready) per cwt — None.
Native Coffee, f.o.b per cwt.—None.

CITRONELLA OIL—
Ready do per lb.—45c

COPRA—
Boat Copra per candy of 560 lb. R60·00
Calpentyn Copra do do R60·00
Cart do do do R57·00
Estate do do do R60·00

CROTON SEED per cwt—R15·00

EBONY—
Sound per ton at Govt. depot—R160,00 Sale this day.
Inferior R125·00 Sale this day.

FIBRES—
Coconut Bristle No 1 per cwt R11·50
Do „ 2 „ None
Do mattress „ 1 „ 3·50
Do „ 2 „ 2 00
Coir Yarn, Kogalla „ 1 to 8 14·75
Do Colombo „ 1 to 8 11·25
Kitool all sizes „ None
Palmyrah „ None

PEPPER—Black per lb None

PLUMBAGO—
Large lumps per ton R550
Ordinary lumps do R530
Chips do R350 Fine qualities scarce.
Dust do R200
Do (Flying) do R120

SAPANWOOD— per ton None.

SATINWOOD (ordinary) per cubic ft. R3·10
Do do per cubic ft. None.

TEA—	High Grown Average.	Medium Average.	Low Grown Average.
Broken Pekoe and Broken	cts	cts	cts
Orange Pekoe per lb	53	47	38
Orange Pekoe do	49	41	36
Pekoe do	42	38	33
Pekoe Souchong do	42	35	31
Pekoe Fannings do	37	27	27
Broken mixed—dust, &c	27	23	23

CEYLON EXPORTS AND DISTRIBUTION FOR SEASONS 1900 AND 1901.

COUNTRIES	Black Tea. 1901 lbs.	Black Tea. 1900 lbs.	Green Tea. lbs.	Coffee—cwts. Plantation	Coffee—cwts. N'tive	Coffee—cwts. Total.	Cocoa cwts.	C'moms lbs.	Cinnamon Bales' lbs.	Cinnamon Chips. lbs.	Coconut Oil. 1901 cwt	Coconut Oil. 1900 cwts	Copra cwts.	Desiccated Coconut lb.	Poonac. cwts.	Coconuts. No.	Plumbago. 1901 cwts.	Plumbago. 1900 cwts.	Fibre cwts
To U K.	93806160	101292051	180510	6517	..	6500	32699	252391	697992	220808	267377	232425	18761	9169548	7960	10873318	180154	115057	61781
„ Austria	45896	24605	..	..	..	..	45	..	6040	17921	8136	9183	25252	112533	..	400	..	2	..
„ Belgium	17741	22636	..	53	..	53	100	6000	85300	151855	5672	2940	68359	494561	82208	213640	19246	30862	22755
„ France	251012	298832	..	204	..	204	187	1469	52700	3920	1802	..	90374	7740	500	406	295	304	842
„ Germany	489742	316158	..	53	69	53	1615	37220	817912	541076	11152	11384	149499	1106600	80051	806560	40491	47438	13261
„ Holland	19041	2000	..	..	..	..	..	..	18500	91840	3716	..	..	58000	..	..	202	912	753
„ Italy	13534	7032	..	..	..	..	..	1046	149700	124432	8713	..	..	150	..	7842	100	..	14
„ Russia	8779503	8298829	5915	127	..	127	123	764	..	..	124	..	58424	..	..	..	3713	1203	..
„ Spain	250	17730	..	..	..	..	..	..	296000	72600	..	..	..	10370	..	..	..	20	..
„ Sweden	53298	63400	..	..	..	..	..	..	..	14200	199	..	3925	13100	..	..	204	303	..
„ Turkey	37582	27610	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
„ India	1069610	83990	16124	68	..	68	2	124934	..	..	122273	76583	1412	..	..	641600	506	1065	19
„ Australia	19548559	15399651	1714	2215	10	2127	226	..	9356	69764	197	634	..	735105	..	..	537	1999	5665
„ America	2529817	3704595	488544	155	12	167	1496	2781	279300	20837	20954	54358	1	867244	..	..	151122	13254	2074
„ Africa	326383	224963	..	..	..	..	..	1497	5000	..	76	42	..	19558	2	1499640	..	..	343
„ China	2806770	1139369	4855	43	..	43	149	5872	15100	..	1114	1034	..	74334	..	2400	..	314	..
„ Singapore	126514	101881	..	..	..	..	1516	559	7700	..	3006	4543	..	..	..	..	..	..	1082
„ Mauritius	44126	16583	..	20	..	20	..	..	..	..	..	..	..	..	..	..	..	..	..
„ Malta	274433	402523	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Total export from 1st Jan. to 2nd Dec 1901	129742036	132210647	967960	9455	61	9362	38155	425133	2435600	1335255	294022	391126	416007	12670438	170721	14049406	402670	332019	109589

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Price Current, London, October 30th, 1901.)

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine cwt.	Fair to fine dry	44s a 80s
Zanzibar & Hepatic ,,	Common to good ..	20s a 60s
ARROWROOT (Natal) lb.	Fair to fine	5½d a 6¼d
BEES' WAX, cwt.		
Zanzibar & Bombay White ,,	Good to fine	£6 a £7 10s
Yellow ,,	Fair ,,	£6 a £6 12s 6d
Madagascar ,,	Dark to good palish	£6 2s 6d a £6 1?s
CAMPHOR, Formosa ,,	Crude and semi refined	105s a ?5s
Japan ,,	Fair average quality	?5s
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	2s 3d a 2s 4d
	Middling, stalky & lean	1s 5d a 1s 7d
Ceylon. Mysore ,,	Fair to fine plump ..	1s 4d a 3s 9d
	Seeds	2s 2d a 2s 4d
,, Tellicherry ,,	Good to fine ..	2s 11d a 3s
	Brownish .	2s 6d
,, Long ,,	Shelly to good ..	?d a 2s 6d
,, Mangalore ,,	Med brown to good bold	2s 3d a 3s 3d
CASTOR OIL, Calcutta ,,	1sts and 2nds ..	?½d a 4d
CHILLIES, Zanzibar cwt.	Dull to fine bright ...	35s a 45s
CINCHONA BARK.— lb. Ceylon	Ledgeriana Orig. Stem	3d a 5½d
	Crown, Renewed	5d a 7d
	Org. Stem	3¾d a 5½d
	Red Org. Stem	3⅜d a 4½d
	Renewed	3d a 5⅝d
	Root	3⅝d a 4d
CINNAMON, Ceylon 1sts per lb	Ordinary to fine quill	9½d a 1s 6d
2nds	,, ,,	8½d a 1s 5d
3rds	,, ,,	8½d a 1s 4d
4ths	,, ,,	8d a 11d
Chips	,, ,,	3½d a 10d
CLOVES, Penang lb.	Dull to fine bright bold	4½d a 9½d
Amboyna ..	Dull to fine	5d a 6d
Zanzibar and Pemba	Good and fine bright	4d a 4¼d
	Common dull to fair	3¾d a 3 15-16d
Stems ..	Fair	1⅝d
COFFEE Ceylon Plantation ,,	Bold to fine bold colory	92s 6d a 120s
	Middling to fine mid ..	80s a 10?s
	Low mid. and low grown	
	Smalls	40s a 60s
Native	Good ordinary	30s a 40s
Liberian ,,	Small to bold	27s a 35s
COCOA, Ceylon	Bold to fine bold	75s 6d a 90s
	Medium and fair	60s a 66s
	Native	52s 6d a 62s 6d
COLOMBO ROOT ,,	Middling to good	7s a 15s
COIR ROPE, Ceylon ton		nominal
Cochin	Ordinary to fair ..	£13 10s a £18
FIBRE, Brush	Ord. to fine long straight	£16 a £19
Cochin ,,	Ordinary to good clean	£20 a £24
Stuffing ,,	Common to fine	£7 a £9
COIR YARN, Ceylon ,,	Common to superior	£15 a £30
Cochin ,,	,, ,, very fine	£12 a £32
do. ,,	Roping, fair to good	£10 a £14 10s
CROTON SEEDS, sift. cwt.	Dull to fair	15s a 20s
CUTCH ,,	Fair to fine dry	23s a 35s
GINGER, Bengal, rough ,,	Fair	34s
Calicut, Cut A ,,	Good to fine bold	5?s a 95s
B & C ,,	Small and medium	50s a 75s
Cochin Rough ,,	Common to fine bold	44s a 47s 6d
	Small and D's	40s a 43s
Japan ,,	Unsplit	41s 6d
GUM AMMONIACUM ,,	Sm. blocky to fine clean	15s a 45s
ANIMI, Zanzibar ,,	Picked fine pale in sorts	£10 7s 6d a £18
	Part yellow and mixed	£7 a £8
	Bean and Pea size ditto	70s a £9 2s 6d
	Amber and dk. red bold	£5 10s a £6 7s 6d
	Med. & bold glassy sorts	80s a 100s
Madagascar ,,	Fair to good palish ...	£4 8s a £8
	,, ,, red ...	£4 5s a £9
ARABIC E.I. & Aden ,,	Ordinary to good pale	35s a 58s
Turkey sorts ,,		40s a 45s
Ghatti ,,	Pickings to fine pale ...	12s 6d a 35s
Kurrachee ,,	Good and fine pale ...	52s 6d a 55s
	Reddish to pale selected	30s a 40s
Madras ,,	Dark to fine pale ..	20s a 35s
ASSAFŒTIDA ,,	Clean fr to gd. almonds	60s a 137s 6d
	Ord. stony and blocky	6s a 25s
KINO ,,	Fine bright	1s 3d a 1s 6d
MYRRH, picked ,,	Fair to fine pale	90s a 115s
Aden sorts ,,	Middling to good	50s a 80s
OLIBANUM, drop ,,	Good to fine white	35s a 55s
	Middling to fair	25s a 35s
pickings ,,	Low to good pale	18s a 23s
siftings ,,	Slightly foul to fine	16s 6d a 22s
INDIARUBBER, Assam lb	Good to fine	2s a 2s 4d
	Common to foul & mxd.	7d a 1s 6d
Rangoon	Fair to good clean ...	2s a 2s 4d
Borneo	Common to fine	1s a 2s 3d

	QUALITY.	QUOTATIONS.
INDIARUBBER (contd.) Java, Sing. & Penang lb.	Foul to good clean ..	8d a 2s 3d
Mozambique ,,	Good to fine Ball ..	2s 6d a 3s 1d
	Ordinary to fair Ball ..	1s 10d a 2s 6d
	Low sandy Ball ..	1s 3d a 1s 7d
	Sausage, fair to good ..	2s 6d a 2s 11d
	Liver and Livery Ball ..	2s 4d a ?s
Nyassaland	Fair to fine ball ..	2s 2d a 2s 9¼d
Madagascar	Fair to fine pinky & white	2s 3d a 2s 6d
	Fair to good black ..	2s a 2s 6½d
	Niggers, low to fine .	7d a 1s 9d
INDIGO, E.I.	Bengal—	
	Shipping mid to gd violet	3s 8d a 4s 6d
	Consuming mid. to gd.	3s 2d a 3s 6d
	Ordinary to mid.	2s 10d a 3s 1d
	Mid. to good Kurpah	2s a 2s 6d
	Low to ordinary	1s 6d a 1s 10d
	Mid. to good Madras	2s a 2s 10d
MACE, Bombay & Penang per lb.	Pale reddish to fine	2s a 3s
	Ordinary to fair	1s 4d a 1s 11d
	Pickings	1s 3d a 1s 4d
MYRABOLANS, Madras cwt	Dark to fine pale UG	5s a 6s
	Fair Coast	4s 6d a 4s 9d
Bombay ,,	Jubblepore	5s a 6s
	Bhimlies	4s 3d a 7s
	Rhajpore, &c.	4s a 5s 9d
Bengal ,,	Calcutta	3s 6d a 5s
NUTMEGS— lb.	64's to 57's	2s 4d a 2s 6d
Bombay & Penang ,,	110's to 65's	1s a 2s 3½d
	160's to 130's	6d a 1s
NUTS, ARECA cwt.	Ordinary to fair fresh	?s a 50s
NUX VOMICA, Bombay per cwt.	Ordinary to middling	4s a 5s 6d
Madras	Fair to good bold fresh	7s a 10s 6d
	Small ordinary and fair	5s a 6s 9d
OIL OF ANISEED ,,	Fair merchantable	4s 9d
CASSIA ,,	According to analysis	3s a 3s 3d
LEMONGRASS ,,	Good flavour & colour	5d a 5½d
NUTMEG ,,	Dingy to white	1½d a 3d
CINNAMON ,,	Ordinary to fair sweet	3½d a 1s 6d
CITRONELLE ,,	Bright & good flavour	9½d a 10d
ORCHELLA WEED—cwt Ceylon ,,	Mid. to fine not woody..	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf	10s a 11s
	,, wiry Mozambique	10s a 11s
PEPPER-(Black) lb. Alleppee & Tellicherry	Fair to bold heavy ...	5⅝d a 6¼d
Singapore	Fair	6d
Acheen & W. C. Penang	Dull to fine	5⅝d a 6¼d
PLUMBAGO, lump cwt.	Fair to fine bright bold	30s a 35s
	Middling to good small	20s a 32s
chips	Dull to fine bright ..	9s a 15s
dust	Ordinary to fine bright	3s 6d a 8s
SAFFLOWER	Good to fine pinky ..	65s a 75s
	Inferior to fair	40s a 60s
SANDAL WOOD— Bombay, Logs ton.	Fair to fine flavour ..	£20 a £
Chips ,,	... ...	5s a £8
Madras, Logs ,,	Fair to good flavour ..	£20 a £50
Chips ,,	Inferior to fine ...	£4 a £8
SAPANWOOD Ceylon ,,	Fair to good	£5 a £5 10s
Manila ,,	Rough & rooty to good bold smooth...	£4 10s a £5 15s
Siam		£7
SEEDLAC cwt.	Ord. dusty to gd. soluble	2?s 6d a 70s
SENNA, Tinnevelly lb.	Good to fine bold green	5d a 6d
	Fair greenish	3¼d a 3⅜d
	Common dark and small	1d a 3d
SHELLS, M. o'PEARL Bombay cwt.	Bold and A's / D's and B's / Small ...	£2 10s a £3 7s 6d
Mergui ,,	Small to bold ..	£6 7s 6d a £6 16s
Mussel ,,	Small to bold ...	22s a 5?s
TAMARINDS, Calcutta... per cwt.	Mid. to fine bl'k not stony	8s a 10s
Madras	Stony and inferior ..	5s a 7s
TORTOISESHELL— Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	16s a 28s
TURMERIC, Bengal cwt.	Fair ...	20s
Madras ,,	Finger fair to fine bold bright	16s a 25s
Do. ,,	Bulbs ..	14s a 18s
Cochin ,,	Finger	17s 6d a 18s
	Bulbs ...	12s 6d
VANILLOES— lb. Mauritius 1sts	Gd. crysallized 3½ a 9 in	14s a 24s
Bourbon 2nds	Foxy & reddish 3½ a 8 ,,	13s a 16s 6d
Seychelles 3rds	Lean and inferior ...	8s a 12s
VERMILION lb.	Fine, pure, bright ...	3s 3d
WAX, Japan, squares cwt	Good white hard ...	32s a [illegible]

THE

AGRICULTURAL MAGAZINE,

COLOMBO.

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for December :—

Vol. XIII.] DECEMBER, 1901. [No. 6.

OCCASIONAL NOTES.

MR. L. A. D. Silva, an old student of the late School of Agriculture, and at present in charge of the Experimental Garden at Mahawalatenne, was awarded a prize for onions at the Show lately held at Ratnapura.

St. Benedict's Institute has made a small start with School Gardening, and with the limited extent of land available for the purpose the results are very creditable. Two other private schools are likely to follow the example of St. Benedict's.

The Superintendent of School Gardens has been travelling in the Three Korales, Kegalle district, with a view to selecting suitable sites for school gardens. The Kegalle district has been described as "The Paradise of the Pedagogue," for the reason, no doubt, that the attendance at the schools is excellent, the accommodation for scholars and teachers most satisfactory, while the interest taken by the revenue officer and the chiefs of the district is an important factor in the success of the schools. Where land is available school gardens may be expected to be found flourishing before long, as the natural conditions for successful cultivation are nearly always present in that favoured district.

Mr. F. C. Fernando, late of the School of Agriculture, who left for South Africa some months ago, says in a recently received letter: "I have enlisted in a medical corps, and am off to Maritzburg *en route* for the front."

In our last issue we referred to a letter received from Mr. John Spencer, Deputy to the Chief of the Bureau of Nature Study (Cornell University, College of Agriculture.) In response to Mr. Spencer's request for a communication from a Ceylon child, a letter was despatched some weeks ago containing a lively description from the pen of a youthful correspondent. The last mail brought the following reply from "Uncle John": My dear———, Your Uncle John is delighted to receive your letter of September 2nd, which was four days before our President McKinley was shot, an event you no doubt know about, but you cannot conceive the shock and grief the tragedy gave everybody. When we have our presidential elections, the feeling of the different parties would seem to be very intense, but I think it must be on the surface. Men who did all they could to defeat Mr. McKinley at each election mourned his death most sincerely. I thank you for your letter. I shall pass it along to my junior Naturalists, my nephews and nieces as I call them, for they address me as Uncle John, and you will no doubt hear from some of them. In a short time I will send you some photographs. Your description of your bullocks and coolies is very good indeed. I wonder if my boys and girls can do as well. Perhaps some of them will tell you about their flower gardens and some of them had flower shows. You will no doubt think I have a novel way of giving my friends an idea of their number. I do not measure them by the bushel or by the ton. I count them by churchfulls. I have enough to fill forty churches, and each church holds 500 boys and girls. Can you compute the number in thousands. Out of that number 6,700 bought flower seeds and had gardens all their very own the past summer. I am fond of every one of them. I cannot help it, for they are so very kind to me. Just now they are engaged in watching crickets. If you have none in Ceylon your father will no doubt tell you about them. Hoping you will let me be your Uncle John the same as with the others, I am, yours cordially and sincerely, JNO. W. SPENCER.

An official of the New Administration in the Transvaal, who has but lately taken up his duties at Pretoria, writing under date the 11th

October, says: "This is a country of great promise—not yet fulfilled—with very rich soil and plenty of water, but the water has not been stored or made available. Its possible future might be anything. The climate is a little too variable, bright and bracing generally; but just now the mists are down on the hills and the rains have commenced. It is very like Nuwara Eliya when the mists are hanging low down. Indeed, Pretoria is situated in a basin like a large Nuwara Eliya. Johannesburg is much higher (5,600 ft.) and is colder. My three Sinhalese servants have done excellently, and we are now installed in a charming little house."

Agricultural Banks for Ceylon have been more than once advocated in our columns. The description of the system as it exists on the Continent and in England will be read with interest by those who are calling for the adoption of some measure (such as exist in India) for helping the small cultivator.

School gardens appear to be making headway in distant Samoa, as to judge by the following extract from a lettter kindly placed at our disposal by Mr. J. P. Williams, the well-known seedsman of Henaratgoda. The writer (Rev. J. W. Hills) says: "I am introducing new plants of commercial value for the benefit of the agricultural department of our Boys' High School, and the Directors of the Society make me only a small grant for the purpose. However, I am asking you to send me one case filled with specimens of the various plants mentioned in your note as near as you can do it. I may say that our garden here at the school is beginning to attract the notice of planters and officials, so that in the long run you will end in increased business in this quarter of the world."

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF NOVEMBER, 1901.

1	Friday	·46	18	Monday	·08
2	Saturday	·21	19	Tuesday	·72
3	Sunday	1·85	20	Wednesday	·21
4	Monday	·03	21	Thursday	·84
5	Tuesday	·04	22	Friday	·31
6	Wednesday	·34	23	Saturday	1·08
7	Thursday	·24	24	Sunday	3·72
8	Friday	2·48	25	Monday	1·62
9	Saturday	·47	26	Tuesday	·43
10	Sunday	·6	27	Wednesday	Nil
11	Monday	2·62	28	Thursday	Nil
12	Tuesday	2·41	29	Friday	Nil
13	Wednesday	·56	30	Saturday	Nil
14	Thursday	·01	1	Sunday	Nil
15	Friday	Nil			
16	Saturday	·46		Total...	21·26
17	Sunday	·12		Mean...	·70

Greatest amount of rainfall registered in 24 hours on the 24th Nov. 3·72 inches.

Recorded by C. DRIEBERG.

MARKET GARDENING—THE RAISING OF SEED.

Having prepared the soil, and decided upon what to grow, and marked out the ground in sections for the different crops, the next most important question is that of

SEEDS.

Seeds to be profitable must be of first-class quality, and it will be found cheaper in the end to pay a good price for good seeds than to buy inferior rubbish, which is dear at any price. Always purchase your seeds from a reliable seedsman, who has his reputation to maintain, and who can be depended upon to send out only seeds of good germinating power, and free from mixtures of any kind other than the variety of which the name appears on each packet.

Some kinds of seeds retain their germinating power unimpaired for several years, cabbage and turnip seeds, for instance, and cucumbers, melons, &c.; while others, such as onions, carrots and parsnips are of very little use when more than a year old.

Peas, beans, &c., are also at their best during the first season.

As it would be a difficult matter for the amateur to distinguish in all cases between good seeds and bad, the only plan is to always purchase from a reliable seedsman. [Seeds may be tested by placing them on damp flannel and noting whether they germinate or not.—ED. *Q.A.J.*]

SELECTING VARIETIES.

In making your choice of the kinds of vegetables to grow, do not be misled by glowing descriptions of certain kinds of cabbages or peas, and purchase them under the impression that you have got something wonderful.

It is much safer and more satisfactory to buy varieties which are catalogued as *standard varieties* or *good market sorts*. It is also worth while to find out from your neighbours the names of any varieties which they have grown successfully, and you will thus be enabled to plant something which has already been proved good, and will be likely to have some measure of success with it yourself.

Many beginners in gardening are disheartened at the commencement by the miserable results of their first attempts, which are in many instances attributable to trying to grow varieties unsuited to the soil or climatic conditions.

If you have no reliable data to go upon, your seedsman will probably be able to help you in the selection of good varieties.

In any case, until sufficient experience has been gained in growing well-known and tested kinds of vegetables, it is not advisable to experiment with anything new or rare. The results of such attempts are sometimes far-reaching, inasmuch as a certain kind of crop is frequently condemned as suitable for a district, because "So-and-so tried it and proclaimed it a failure." People are very apt to accept statements of this kind without going to the trouble of verifying them for themselves.

I have often been told that a certain kind of vegetable will not grow here, because it has already been tried by someone, when, as a matter of fact, it has proved to be as easy of cultivation as pumpkins or maize, if accorded proper treatment. It is always safe, however, for the beginner to profit by the successes of his neighbours at first. There are many things which only experience can teach, and it is rather expensive to go experimenting with unfamiliar kinds of plants, before learning how to grow the known and established varieties.

SOWING THE SEEDS.

Some kinds of vegetable seeds are sown in seed-beds, and when large enough transplanted to the open ground; others are sown directly in their permanent places. For a seed-bed, I know of nothing better than the plan recommended by Mr. Nevill for raising young tobacco plants. A full description and illustration of this form of seed-bed appeared in Vol. II., Part 3 (March, 1898), of this *Journal*, and I can confidently advise its adoption for raising young plants of any kind.

Cabbages, cauliflowers, lettuce, tomatoes, and numerous other kinds are always raised in seed-beds; and it will be found better to sow these all in narrow shallow drills in the bed than to sow broadcast. Young plants grown in drills are much easier to lift and transplant than if broadcasted, and as a rule are stronger and sturdier. In preparing the bed, the soil should be raked as finely as possible, and the seeds must not be sown too deeply. A quarter to a half inch of soil above the seed is usually enough. If the drills are covered in with a little very fine and thoroughly rotten manure, germination takes place quickly, and in transplanting a ball of the manure will stick to the rootlets, thus increasing the chances of success in planting.

In preparing soil for seed-sowing in the open ground, always have the soil thoroughly tilled, cleaned from weeds, and well pulverised. An Acme harrow immediately following the plough will reduce most soil to a very fine tilth; and if not, the rake must be used to finish off, especially with such seeds as carrots, onions, &c.

Where enough ground is available, I should recommend sowing all such crops as these in drills from 2 to 3 feet apart, so that horse cultivators can be used among them.

However, this subject will be more closely gone into when dealing with crops in detail.

TRANSPLANTING.

For transplanting, the ground should be prepared, more especially for delicate plants, in precisely the same way as for seed-sowing. The finer the surface soil is, the more easily will the young tender rootlets be able to force their way down in search of food and sustenance; and as a consequence leaf growth will necessarily follow.

If the soil is hard and lumpy, the attempt of the rootlets to strike into it becomes to some extent useless, and it naturally follows that the top growth also becomes retarded, and it will only be by good luck if the plants come to anything. When taking the plants from the seed-bed, be careful not to break the roots too much, and endeavour to lift them with a little of the soil adhering. Never pull young plants up, but lift them carefully. It is a good plan to give the bed a thorough soaking with water some time before beginning to lift the plants.

Always, if possible, choose a dull or showery day for transplanting; but should the weather be warm and dry, do the work in the afternoons, and water well after planting; and if suitable material is procurable, mulch the ground for a few inches round each plant. Set the plants a little deeper in the ground than they were in the bed, and firm the soil well around the roots without bruising the necks of the plants.

Take care always to make the hole for planting just deep enough, so that the plant will not *hang* in it, and give the plants plenty of room to grow, by setting them a little wider in the rows than the size of the plants when fully grown.

For example, if a cabbage will cover 2½ feet on the outside leaves, set the young plants of that variety out 3 feet apart each way.

Should the weather be dry for some time after planting, it will be necessary to water the young plants several times a week until they become established; the watering being done either early in the morning or late in the afternoon.

A great deal of watering and hoeing will however, be saved if *mulch* is used as already advised. The importance of mulching cannot be over-estimated. Almost anything will do—stable manure, grass, or litter of any kind, provided it can be easily and conveniently placed round the plants. Mulching prevents the ground from baking after watering, and so saves hoeing; and it also helps to arrest evaporation, to us saving watering; and also it tends to keep the temperature of the surface soil equable, and so tends to promote healthy and vigorous root-action. I confidently recommend mulching for any kind of vegetable crops which require transplanting, and am sure that the grower will never give it up again so long as he aims to get the best possible results for his work with as little labour as possible.—[H. W. GORRIE in the *Queensland Agricultural Journal*.]

[We shall reproduce Mr. Nevill's instructions for making seed beds and raising seeds in over next.—ED. *A.M.*]

POULTRY NOTES.

(*Culled from Various Sources.*)

There is a great similarity between the various poultry-powders and foods. The powders are popularly supposed to increase the egg-laying powers of hens. The following are a few typical formulas:—Powdered eggshell, or phosphate of lime, 4 oz.; iron sulphate, 4 oz.; powdered capsicum, 4 oz.; powdered fenugreek, 2 oz.; powdered black pepper, 1 oz.; silver sand, 2 oz.; powdered lentils, 6 oz. A tablespoonful to be mixed with sufficient food for 20 hens. Oyster-

shell—ground—5 oz.; magnesia 1 oz.; calcium carbonate, 3 oz.; bone—ground $-1\frac{1}{2}$ oz.; mustard bran, $1\frac{1}{2}$ oz.; capsicum, 1 oz.; sodium chloride, 1 oz.; iron sulphate, $\frac{1}{2}$-oz.; sodium carbonate, $\frac{1}{2}$-oz.; sulphate, $\frac{1}{2}$-oz.; beef—lean, dried and powdered—10 oz.; fine sand, 10 oz.; corn meal, 20 oz.; linseed meal, 20 oz. Reduce all to moderately coarse powder and mix well. The above are formulas that are recommended by poultrymen, and are based upon practical experience in poultry-feeding, not upon the theoretical knowledge of pharmacists.

Indian corn will fatten geese quickest, but it makes the fat very yellow; and when the bird is put before the fire to roast, an undue amount of it becomes goose-greese. Oats are much better. They may be given crushed or whole. The former is the better; and a barley-meal and oat-fattened goose is always a heavy-weighing, firm, well-flavoured bird.

There are many readers of a poultry column, as well as fanciers and others, who consider that too much is made of *Cleanliness*. Writers of the poultry columns are constantly harping on the subject, but it is in duty bound and in the best interests of those who keep poultry that this subject receives so much attention. I should not be far wrong in saying that 60 per cent. of the fowlhouses in the colony are so dirty that it is impossible for fowls to live in them in a healthy condition. Filth is the sure cause of disease, and ofttimes death; indeed, it is the one great curse in keeping poultry. If your fowls droop, or are ailing, see if the house is infected with lice or tick. If it is, so are the hens, and also are the nests. Do you think you would enjoy life yourself if a myriad of insects were for ever boring into your skin, preventing all comfort during the day and all rest at night? Yet this is the usual experience of the vast majority of fowls. They are overrun with lice or tick. Many of them have broken-down, draughty houses, fœtid runs, impure water, and then their owners wonder why they don't lay a plentiful supply of eggs. Cleanliness is second only to godliness in the human creature; in poultry-keeping there is nothing comes before it. It is the first and most important condition of success. It is advisable, therefore, to occasionally examine your birds for the purpose of detecting any parasites that may from time to time molest them. This remark also applies with regard to the houses. As the moulting season draws to an end, it is advisable to thoroughly lime-wash all poultry-houses, coops, &c., and if you have any suspicion that tick or other parasites are present use Little's Phenyle profusely in all the crevices, corners, and other places where these pests are likely to congregate. If this is neglected, the fowls which should in a very little time present quite a gay and glossy appearance will be found with their feathers eaten away to such an extent as to entirely spoil their appearance, and may eventually be found pead just for the want of proper attention.

The secret of raising chickens is to keep the growing all the time. To do this they should have nourishing food, a fair range, and not be overcrowded. Poor feed is expensive at any price where chickens are concerned. It is best to let chickens run at large, providing they do not go so far as to keep them tired all the time. A young chicken can be run down the same as the young of any kind, and when this is the case they will not prosper. They thrive unusually well in orchards, the reason being they are shaded, and insects are more plentiful. A piece of land where a fair amount of grass, old trees, and loose soil abound is the very best place imaginable to raise chickens, and especially after they have reached the age of four to six weeks old. Under the old leaves, and along the logs and fallen timber there is an abundance of insects, &c., which make splendid food, the shade is plentiful, and the green food contains the elements for building up the body. It is essential to give them all they can eat in the morning and evening, and if the range or run does not afford "good picking" it is best to scatter cracked grain where they can find it by scratching. A chicken that receives every atttention and is pushed right along for the first few weeks must not be neglected, for if permitted to stop growing it will never fully recover.

The question is often asked, "How many females should be mated with a male bird?" To answer this correctly is not easy, for much depends on the male himself; besides each variety or breed will differ more or less. For instance, the Asiatics, or large breeds, will not take as many females as the Mediterranean, or lighter breeds. I have become a believer in mating a larger number of females than the orthodox rule, and I find I get better results, especially with the lighter breeds. Early in the season fewer hens are needed, but as the season advances the numbers may be increased. For the lighter breeds I generally mate up five or six hens, and add as the seasons advances, up to nine or ten, and even *twelve* hens. With the medium breeds—Wyandottes, Orpingtons, etc., four or five at first, and increase up to eight or ten. With the larger or heavier breeds, three or four hens early in the season and increase up to eight. Of course, a good, lively, vigorous male bird must be at the head of affairs to get best results. The hen should be considered as well as the male bird, and must be sound and healthy if we wish to get good fertile eggs. On her depends the greater part of the production of the future chick. She should produce a perfect egg, stored with the proper nutriment for the development of the embryo, and the foundation of health, growth, etc., for the future bird.

During the hot summer months the fowls' drinking pots should be kept out of the sun, and should be filled with water as we would use ourselves. Shade of some kind should be provided for all birds; if no trees, or sheds are handy, t shade can be made of boughs, bags, or anything t will shade a part of the run from the hot d y

sun. Green food should be supplied regularly every day to young—as well as the old stock—if we wish to keep our poultry in perfect health. The best time to feed green-food is at mid-day, and there should not any left about the pens or yards.

In rearing ducklings there are two objects to be kept in view, that of rearing to maturity for stock birds, or for fattening for table, as the two methods differ very materially. When ducklings have been hatched for twenty-four hours they will require their first meal; hard-boiled egg mixed with pollard or bread crumbs is a good first meal. When the duclking are two or three days old, their food should consist of pollard and bran (3 to 1 respectively) mixed into a nice crumbly mass—not too sloppy—green food—cut up fine, and a little animal food. Of course clean water should always be before them, and nice clean sand which they will use as grit.

In the large majority of cases (writes an English weekly, where fowls are kept in thickly-populated districts, the only object is to obtain eggs, not to rear chickens. Under these conditions there is no occasion whatever for the presence of the male bird. Numberless experiments have proved this. The United States Government maintain, at considerable expense, an Agricultural Department to investigate all matters of interest to the farmer. That Department has closely and scientifically examined the question as to whether the male bird is needed for the production of eggs, and the conclusion arrived at was that the laying of the hens is greater if they are kept alone. It has also been proved again and again in this country that the "crowing gentleman" is not necessary where eggs only are needed, if the town poultry-keeper will stock his yard with hens only. Even if it is considered necessary to hatch some chickens, a sitting of eggs, guaranteed fertile, can be easily purchased for a small sum.

THE AGRICULTURAL BANK.

[Mr. Sutton Nelthorpe, a Large land holder in Lincolnshire has succeeded in establishing, and, with the assistance of a Managing Committee and an excellent Secretary (Mr. Spencer) in efficiently maintaining an Agricultural "Credit Society" since 1894.]

Most people, writes Mr. H. Rider Haggard in the *Daily Express*, have heard of the Reiffeisen system of agricultural banks, of which the object is to promote and foster co-operative personal credit, and to advance moneys to small agriculturists wherewith to enable them to carry on or extend their business.

The underlying principle of these banks is collective guarantee; thus all the members are responsible for the default of any one of them, the basis upon which the system is built up being the established character for probity and sobriety of the individual members of each association.

The success of these banks upon the Continent has been colossal. I believe that there exist at the present moment nearly 2,500 of them, and that their transactions in 1898 amounted to a total of about £11,000,000.

Further, it is the boast of this foreign Raiffeisen Agricultural Bank Association with its two thousand odd affiliated societies, that since the beginning of the enterprise in 1840, neither member nor creditor has lost a shilling by them, whereas the good they have done to struggling agiculturists can scarcely be expressed in words.

That this is the opinion of the Prussian Diet is shown by the fact that, in July, 1895, a Bill was read a third time in the House of Deputies establishing a Central Co-operative Bank, of which the object is to grant loans to and receive deposits from co-operative unions and co-operative credit banks. To further this end the State granted to the said bank as original capital a sum of £250,000.

When we turn to England it is, as might be expected, to find that in the matter, having to do with agriculture and the welfare of the rural population, little or nothing has been done.

In 1895, at the instance of Mr. Yerburgh, M.P., some information was obtained from the Continent through the Foreign Office officials, and there the thing stopped. Also I believe I am right in saying that largely through the enterprise and energy of Mr. Yerburgh, the Co-operative Banks Association has been founded, but as yet, I understand, has not progressed very far. How can it, fighting against such a sea of prejudice, ignorance, and Parliamentry indifference.?

Our Governments can squander millions and tons of millions upon foreign enterprises and wars, some of which at least are of doubtful advantage, but what amount of pressure would it take to extract from them even £250,090 to assist a movement of this sort? That sum is about the sixteenth of the cost of, let us say, the Uganda railroad, and the benefit which would result from its judicious use in the establishment of people's banks must, I firmly believe, be a truer defence and benefit to this country than a dozen East African railways.

Yet, as it would benefit not trade but agriculture and the land, what chance is there that it will ever be forthcoming, or indeed, any earnest and heartfelt Government assistance in this and kindred matters?

The Scawby Credit Society started with the modest capital of £200 in 1894. Today it is quite solvent, and even boasts a reserve of £3 12s., having since its origin granted loans to the extent of £577—twenty-two in all, running from £50, the maximum allowed, to £5. During this period of activity it has suffered no losses and incurred no bad debts.

To exemplify the working and usefulness of the bank, I do not know that I can do better than quote two on three specimen cases, names only being suppressed.

Case 1.—A farm labourer, an industrious man who had brought up a large family and managed

to save a little money. He took half an acre, then three acres and the proverbial cow, then, when nearly sixty years of age, seized the opportunity to hire a small farm of fifty acres, which he managed to enter and stock, except with sheep.

To purchase these the Scawby Society granted him a loan of £30 on his own security, consisting of his live and dead stock and corn in stack, which he insured at the instance of the society for £150. But for this loan the borrower would have had to sell his sheep food to his own loss and to the damage of the farm. Having punctually discharged his debt, he applied for a fresh loan of £40, again to buy sheep, as his roots were more plentiful than in the previous season. The loan was granted on the same security as before, and duly discharged.

Next, one of £20 was granted, and paid off to the day. After a year the borrower saw a chance of placing his sons on a small farm which he partially stocked for them. To do this, however, and replenish his own holding, he applied for another loan of £50 which was granted on the same security.

This chain of loans, therefore, has assisted in starting the tenants of two small holdings and it is estimated that if the original borrower were now to go out of farming after six years he would have been found to have quadrupled the capital with which he started.

Case 2.—A working foreman heard of the Scawby Credit Bank and deposited with it a sum of £50. When the chance offered of taking a farm of seventy-three acres, he borrowed £50 on the security of his deposit, and a further £50 on that of his stock and implements and the guarantee of two sureties.

Even in the present bad season this man's farm looks well, and, as he is hardworking and knows his business, his success is fairly certain.

Case 3.—A foreman in a commerical concern established himself independently in the same line of business, and locked up his small capital in manufactured goods of his own production. He was granted a loan by the Scawby Society on the security of his stock in hand and of two sureties. This loan was repaid and a fresh one for a smaller sum granted, which, after an extension of time, asked for on the ground that it would enable the borrower to establish himself, was duly repaid. This man has now secured a connetion of customers, and has a good prospect of success.

But for these loans he would have been obliged to sell his first manufactured stock at a scarifice, and must have drifted to his old position, and thus lost the independence he coveted.

It will, I think, be submitted that the above sample instances demonstrate the utility of co-operative people's banks more clearly than could be accomplished by any amount of argument.

And if these things are done in the green tree, what might not be done in the dry? The Scawby Bank, with its tiny capital of £200, has in the course of a few years succeeded in assisting quite a number of industrious struggling folk to advance themselves in life and attain to independence. What, then, might not happen if there were hundreds of such institutions scattered up and down the land, having the strong support and sympathy of some central authority, and engaged, each of them, in the judicious dissemination of capital among deserving folk, who mutually guarantee its repayment, that it may be used again to help others in their turn?

It is said that the great banks would be hostile to any such movement, but why should they be hostile, seeing that the business is not of the class which they would care to do, and that being co-operative, it produces no profit except to the co-operators? On the contrary, I believe that if it were put before them in a proper light, they would be glad to assist in the establishment of such societies, seeing that these would in due course manufacture customers for themselves, and, by increasing the wealth of the country, give them more money to handle.

The utter indifference of our Governments is, I think, much more to be feared than any hostility on the part of the large banking institutions. That these co-operative credit societies can be made to do good work in England as well as on the Continent has, I think, been demonstrated by Mr. Sutton Nelthorpe and his Committee at Scawby. Possibly also there may be other successful instances with which I am not acquainted. Now it remains for the country to follow this excellent example, and thereby help to satisfy one of its most pressing needs—the multiplication and development of the desirable class of small holders.

DIFFERENT SYSTEMS OF HOUSING CATTLE AND CONSERVING MANURE.

[REPORT BY THE PRINCIPAL, CAWNPORE AGRICULTURAL SCHOOL.]

Dry Earth System.—Where litter is scarce or when the quantity of manure made in the year is deemed subordinate to perfect cleanliness of the shed the following method will be found the simplest:—

Beat down the floor of the cattle shed with clay, to make it level and hard, give it a gentle slope, and at the bottom of the slope have a small drain lined with ordinary tiles. Let this drain lead into a small pit holding an earthen vessel; a common *ghara* will do very well. When the cattle are tied in the shed the urine soaks into the earth on the floor, and any extra urine not so soaked in, flows down the slope into the earthen vessel. Every morning the cattle-attendant removes the dung, scrapes the wet parts of the floor and puts over it fresh dry earth, at the rate of about 10 lb. for a pair of cattle. The urine in the pot (if any) and the scraped earth are thrown into the manure pit, either separate from the dung or along with it, according as the farmer intends using the urine-earth at shorter intervals than the dung or all together. Naturally, in this method also, a little more earth is necessary in rainy

weather, for which period the farmer will have to keep a store of dry earth in a place protected from rain.

By this method the urine is fully utilized and the shed remains as neat and clean as a cattle shed can possibly be. It has been under trial for about four years at the Cawnpore Experimental Station, and so far presents no difficulty that will fall in the way of its general adoption by cultivators. To what extent the earth applied to the shed increases in manurial value by absorbing the urine, will be seen by the following figures. Dr. Leather analysed the earth used at the Cawnpore Station, before using it, when it was used once, and when it was used twice; and found the percentages of nitrogen to be respectively 0·031, 0·224, 0·395. From the shed of a pair of working cattle about 4,000 to 5,000 lb. of earth may be expected to accumulate in the year which means that about 7 to 10 lb. of nitrogen has been saved. In producing immediate effects on a growing crop the nitrogen of this earth acts like that of saltpetre or sodium nitrate and can be reckoned as equal to not less than 20 to 30 lb. of nitrogen of dung or straw or litter. Instead of accumulating the earth the whole year, in which case the earth must be losing a part of the nitrogen by fermentation, the accumulations of shorter periods can every now and then be used as a top-dressing to any crop standing at the time. If this plan be adopted and the daily scraping of the wet earth be thoroughly done and the use of dry earth be liberal, there is no reason why the year's urine-earth of every pair of working cattle should not be sufficient to give the cultivator an additional yield of from two to four maunds of wheat, maize or other food grain. Fresh urine-earth unlike fresh dung does not encourage white-ants in a growing crop.

When some litter is available, as is often the case when a cultivator has some area under sugarcane, it may be spread on the floor of the shed during the cold weather months from November to February to give the cattle a warmer bed to lie on. And this bedding may be removed once a week or so. It should, however, be remembered that this plan is recommended only with a view to the better comfort of the cattle, and that for preserving the urine and making the most out of it as a manurial agent the mere dry earth system is one of the best and simplest.

The Manure Heap.—Whatever be the system of housing cattle that the farmer adopts a manure heap will be a necessity. If the box-system be adopted the dung will be preserved in the box itself; but there will be a lot of rubbish to collect and preserve for using as manure. For this purpose a pit should be dug on comparatively high ground so that it may not get submerged under water in the rains. The sides and bottom should be plastered with clay, and a cheap thatch put over it to protect from sun or rain. The dung, the sweepings of the household, all vegetable refuse as the leaves of sugarcane, useless weeds and straw, fallen leaves of sheesham, mango, or other trees and also any animal remains available should be put into it. The dry leaves shed by trees in the autumn and those of sugarcane contain in 100 lb. about ½ and 1 lb. of nitrogen and so make generally as good a manure as cattle dung, while animal remains make much richer manure. By taking care throughout the year in this way a cultivator can make in the year about 150 to 300 maunds of manure for every pair of cattle kept by him, according to varying circumstances.

If no thatch be put up over the heap it should be covered with earth to prevent the loss of nitrogen. Even in the presence of a shed, covering the heap with earth will be a good plan; when the heap gets very dry in the cold or hot weather some water may be poured on it just to moisten it. By this means not only will the heap rot or ferment well and become a readily atingc manure, but the loss of free nitrogen which takes place when the heap gets dry and mouldy will also be prevented.

MUSHROOM CULTIVATION.

We have been asked for information regarding the cultivation of mushrooms, and we fancy we cannot do better than quote from an article on this subject contributed some time ago of Mr. A. J. Boyd of the Queensland Agricultural Department to the *Queensland Agricultural Journal*:—

The directions for raising mushrooms without the aid of spawn are also given, and we shall be glad if some of our readers will give the process a trial and report results to us.

PREPARING THE BED.

During January or February a quantity of fresh horse-droppings should be collected. They must not be piled up in a heap, but rather spread out thinly under a shed until required. Dig trenches 1 foot deep and about 4 feet wide; into the trenches throw the droppings to a depth of 9 inches. Then ram or tread them down firmly to exclude the air as much as possible, thus preventing the droppings from heating too much. Now break up the spawn bricks into pieces the size of a large marble, and set them a foot apart almost on the surface of the manure. If no rain should come, give the beds a fair sprinkling of water, and a few days afterwards cover the manure and spawn with 3 inches of fine soil. In Queensland we often have heavy rains in February. Too much water is injurious to the spawn, so it would be well to provide some shelter for the beds. If the weather is suitable, within a month or six weeks after covering up the spawn with earth, tiny white buttons spring up at intervals all over the bed, the spawn being distributed in spaces about 1 foot apart. These little buttons rapidly develop into mushrooms, and in about three weeks they are large enough to cut for the market.

They do not grow steadily, but after a week or two of slow progress they suddenly begin to expand, and in a few days double or quadruple in size.

One of the strangest things about them is that they can be produced spontaneously, as it were,

from a bed of manure and earth properly prepared and cared for.

Without spawn or seed of any kind, if the work is properly done, after a few weeks the mushrooms will spring up from a bed of this kind, and for about three weeks they can be gathered. But that exhausts the bed, and you will never get another mushroom from it unless spawn is introdaced. It would appear that the seed is in the mixture of manure and earth naturally, and needs only proper conditions of warmth and dampness to bring it to perfection. These mushrooms produced in this way are rather an inferior grade, however, and do not compare with those raised in the usual manner from purchased English spawn.

Cultivated mushrooms also are far superior to the wild variety. The latter do not attain the size and fleshiness of the former, owing to want of proper conditions and sudden changes of temperature. To raise them in perfection, a heat of from 60 degrees to 70 degrees Fahr. is sufficient. To be palatable, they must be fresh. In very warm weather they will not keep well, and in wet weather will become maggotty. The gills (or underside of the mushroom) turn black when too old or damaged by weather, and a few black-gilled mushrooms will damage a whole basketful if they are kept together for even a whole day. They also lose their flavour, and get tough if picked for any length of time. Fresh mushrooms are very brittle, and must be picked with great care, and broken mushrooms are not eagerly bought up by lovers of this edible. In France, and I believe also in America, mushrooms are grown in cellars. In Paris there is a vast number of cellars devoted to their cultivation, and also to that of the "Champignon," a more slender kind of mushroom and of more delicate flavour. It is, however, difficult to distinguish between the Champignon and poisonous fungi of similar appearance, and many persons have suffered from eating what they, in their ignorance, had gathered for Champignons, but which were, in English, "Toadstools." I have not seen the Champignon in Queensland; but there is no reason why it should not be found here as well as the mushroom and the truffle.

Cellar Cultivation.

The first requisite is equable temperature; the next, dampness; and the third, gloom. The best way to prepare the cellar is to build shelves all round the walls and in the centre, indeed anywhere, so long as room is allowed to pass between the shelves. On these shelves boxes a foot deep are placed. They may be of any suitable width and length, but they must have the depth. As soon as the boxes are in position, the next thing is to prepare the beds for the reception of the spawn. I have already shown how to prepare the bed in the open, and the same method will serve for the cellar bed, the spawn being put in a little further apart than was the case in the garden, the reason being that we shall have a larger crop on a given area owing to the superior conditions of temperature and damp. Sixteen inches is not too great a distance between the fragments of spawn. The temperature must be kept at about 60 degrees or at the most 70 degrees F., aad such a temperature is easily maintained in a cellar even in our hot months. Next comes the question of dampness. This is essential. But it is not always necessary to water the beds. As before said, too much water is injurious to the spawn as well as to the mushroom. The plan adopted in Paris cellars is to water the stone or brick floor and also to sprinkle the walls. In America the same thing is done by cellar growers. I lately came across a Chicago paper in which some account was given of a celebrated mushroom-grower (W. C. Blakemon) in Chicago, who realises a handsome income by growing mushrooms in a dark cellar-like barn in the heart of the city. He has a number of boxes of earth, piled over each other, resting on shelves arranged like the bunks in an emigrant ship. Narrow aisles run between to enable him to attend to his crop. Except for the light of a lamp he carries, all is darkness in this moist warm den. The mushrooms are not picked by hand. This often results in the top breaking away from the stem, and thus the market value is lessened. Mushrooms should be snipped off about half an inch below the head. A long stick with a sharp brad in the end is used to harpoon each button or formed mushroom. The area of earth space in the boxes under notice is $1\frac{1}{2}$ acres. Every morning 50 lb. of fresh crisp mushrooms are taken from the beds and sold. The business is a very profitable one, and the crop never ceases. The expenses after the first outlay are not heavy. Mushroom spawn in Ameiica is worth from £1 to £1 10d per 100 lbs. It can be purchased in Queensland in small quantities for 1*s*. per lb. brick.

But the intending grower can produce the spawn artificially in this way: Mix two or three kinds of dung—horse and sheep or horse, sheep and cow dung—and keep up under cover, treading it down as the heap grows. Then cover the lot with fermenting horse dung or with bags. In a month or six weeks, if the compost heap has not been over-heated, you will find on taking out a handful of it that there are small white threads running through the dung. This is the mushroom nucleaus, It will not keep, however, and should be used at once. In a stable which had not been cleaned for some time I have found the white mushroom fibres on breaking a piece of the trampled dung. Seeing that mushrooms can be raised in any odd, dark, damp shed with very little labour, and that there is always a ready sale for these in the cities, the business should be a profitable one.

PLANT LIFE.

[A SERIES OF SIMPLE LECTURES INTENDED FOR, A CLASS OF JUNIOR STUDENTS.]

LECTURE III.

Nutrition.—Plants, like us, require food and water for their sustenance, but the means by which

nutrition is supplied to the plant as well as the elements and sources of plant nutrition are very different from those of animal nutrition. All animals, including human beings, are either carnivorous, herbivorous or both, that is to say, they consume animal food or vegetable food or subsist on a mixed diet. But vegetation is the ultimate source of all animal food, for either directly or indirectly it is to the plant that we must trace the source of animal nutrition. We can imagine, for the sake of argument, a man becoming independent of animal food, in the absence of animal life, but we cannot imagine the opposite state of affairs, for granted that human beings can maintain themselves on a purely meat diet, the latter would not be available inasmuch as vegetation would still be necessary for the nutrition of the lower animals whose flesh we consume. It comes to this then, that plant life is absolutely necessary for human nutrition.

Let us now enquire how plants get their food, The source of plant food are the atmosphere and the soil. From the atmosphere the plant draws one very important element of plant food, namely, the carbon which helps to build up the framework of the plant. I have already been speaking to you about the carbonic acid which is present in the atmosphere. It may be said to be an adulterant in an otherwise pure atmosphere consisting of nitrogen and oxygen, and is produced as the result of respiration (exspiration) of all animals and plants, as well as of the combustion and decomposition of organic substances. As a result the oxygen of the atmosphere has a great tendency to be exhausted and to be replaced by carbonic acid, for it is the oxygen of the atmosphere that combines with carbon from whatever source to form carbonic acid. But the composition of the atmosphere, as I have already told you, is practically constant in spite of this, that is the proportions of nitrogen and oxygen vary very slightly, at any rate not to a sufficient extent to cause any inconvenience to human beings. Under normal conditions there are to every 100 parts of atmospheric acid, 79 of nitrogen and 21 of oxygen, and this quantity of pure air is ordinarily adulterated with 1-25th part of carbonic acid.

Now the means by which the composition of the air remains practically unchanged is the same means by which plants obtain carbon from the atmosphere. This process is technically known as *assimilation*, and consists of carbonic acid being taken by the plant from the air through the stomata, the carbon retained or fixed, and the oxygen given out. It is like a sum in subtraction; the plant takes in carbon and oxygen in combination as carbonic acid, substracts the carbon and liberates the remaining oxygen. Now you will see how the plant purifies the atmosphere while it secures the carbon necessary for its nutrition. This process is, indeed, the exact opposite of the process of respiration, which consists of the taking in of oxygen and the giving out of carbonic acid. There is no difference in the process of respiration as carried on by plants and animals; but assimilation in plants is the opposite process which counteracts the effects (the vitiating of the atmosphere by accumulation of carbonic acid), of respiration in plants and animals, and not only respiration but also the combustion and decomposition of organic matter. Thus is the atmosphere preserved in a condition suitable for human life.

GENERAL ITEMS.

According to an American paper the *Public Health Journal*), the dreaded mosquito, which is such an intolerable nuisance in the summer months, more particularly along river banks and on the sea coast, can be easily abated by the use of a very simple remedy, It is stated that but two and a-half hours are required for the development of the full-grown mosquito from a mere speck, its first stage. It can be instantly killed either in its infancy or at maturity by contact with minute quantities of permanganate of potash, the cheap purple salt which is used so much for disinfecting purposes. It is said that a solution of the salt containing only one part in fifteen thousand of water, distributed in the marshes where the mosquito breeds, will render the development of their larvæ impossible. To quote the *Journal* itself :—"A handful of permanganate will oxidise a ten-acre swamp, kill its embryo insects, and keep it free from organic matter for thirty days at a cost of 25 cents. With care, a whole State may be kept free of insect pests at a small cost. An efficacious method is to scatter a few crystals widely apart. A single pinch of permanganate has killed all the germs in a 1,000-gallon tank."

Not many people are aware that the onion contains a principle which acts on the nerves in a manner similar to the action of opium. Unfortunately, the persistent odour of the vegetable makes sensitive persons disinclined to use them at all events in the raw state. Now, an onion taken at night is one of the best sleepinducers. The element above mentioned has the effect of calming the nerves, and consequently of lulling the brain to rest.

A correspondent to the *Queensland Agricultural Journal*, writing of the Brinjal as a neglected vegetable, says: "It is a vegetable of considerable excellence and has the merit of being hardy and very easily cultivated. Care should be taken to gather the brinjal before it passes its prime; otherwise it is unpalatable. The purple-fruited, of which there are several varieties, is usually cultivated for the table; it should be picked before it loses its brilliant purple hue. There are several ways of cooking it; an approved way is first to boil it from 20 to 30 minutes, then to slice and fry it. When thus treated, it is a delicious vegetable. I noticed when in London and Paris, last season, that the brinjal was frequently in evidence. The price quoted was about 2*d*. or 3*d*. each. It is known in London by

its French name, "aubergine": this is probably because the London market is supplied from France. The brinjal is largely grown in India; it is also esteemed in Germany, Italy, and other European countries, but more especially in the United States of America. It is an annual, but it continues bearing for some time in Queensland. I have had it fruit three years in succession. I have grown the white kind, which is also edible, and recently a white, striped with purple, which was as good as the purple.

How great are the possibilities of Hawaii as a fruit and vegetable growing country, will be understood, says an exchange, when it becomes known that four crops of potatoes have been produced in successson on the same piece of land within twelve months. Radishes become edible in ten days after showing. Strawberry vines bear fruit all the year. The berries are of the finest flavour. Cabbage grows all the year, and it apparently makes no difference whether it is planted in the spring, summer, autumn or winter. Parsley once sown, grows forever, apparently. Lima beans continue to grow and bear for over a year, and they have to be gathered every week after starting to bear. Cucumbers bear the entire year, and so do tomatoes, which, with proper attention bear for years. Raspberries bear for six months. Pineapples come into bearing when the plants are four months old and bear in abundance for years. Lettuce can be planted at any time and it develops quickly. The same is true of celery.

Those who have been interesting themselves in rhea cultivation in Ceylon will be interested to learn that there is at the Buffalo Exhibition a machine which defribiates ramie from the green stalks. The exhibitors of the invention are the Egssan-Packer Defribator Co. of New York. It is reported to have been worked with success in the field in Florida, cleaning 4 tons of green stalks per day and requiring less than one horse-power to operate.

Indian Gardening publishes a most interesting article, detailing a curious discovery made by Mr. N. G. Mukerjee, M.A., M.R.A.C., Professor of Agriculture, Civil Engineering College, Sibpur, in the cultivation of rice, which should have an important practical bearing on this crop —in Bengal at any rate. Mr. Mukerjee has, in fact, succeeded in evolving an *aus* paddy with *aman* tendencies, in addition to producing superior varieties of *aus* paddy. It is expected that the discovery will be of material benefit to cultivators, and our contemporary recommends that steps should be taken to make known the discovery far and wide.

Here is a simple, inexpensive and practical contrivance for keeping birds out of fruit trees, which might answer for scaring away sparrows from paddy, parakeets from Indian corn, squirrels from cacao, custard apples, &c. It consists in hanging a small mirror on the top limb of the tree. There should be at least six inches of string to the mirror, so that it can swing about when moved by the wind. It is said that the flash of the mirror creates a scare. One or more cheap mirrors used thus on each tree are said to have answered well in the Philippines, and the birds do not grow familiar with the contrivance as in the case of scare crows. The experiment suggested is well worth trying.

Soot and lime are very useful in keeping off slugs. The material should be sprinkled around the rows so shat the slugs cannot cross the line formed. When this is done there will be little to fear from slugs, and where the operation is neglected, they are in the vicinity of crops, they will come out and devour the leaves in the most destructive manner. Land affected with slugs should be kept free of weeds and rubbish and the land constantly stirred up and kept open.